

REVISION OF THE GENUS *ASTRAEUS* LAPORTE & GORY (COLEOPTERA: BUPRESTIDAE)

by S. BARKER*

Summary

BARKER, S. (1975).—Revision of the genus *Astraeus* LaPorte & Gory (Coleoptera: Buprestidae). *Trans. R. Soc. S. Aust.* **99**(3), 105-141, 30 August, 1975.

A revision is presented of the Australian Buprestid genus *Astraeus* LaPorte & Gory. Following van de Poll (1889), but extending the status given by him to two separate groups within the genus, two new sub-genera are proposed, *Astraeus* (*Depollus*) and *Astraeus* (*sensu stricto*). The genus is considered to contain 39 valid species. The species are keyed and a complete description or redescription is given of each, together with an illustration of all species not previously figured in a publication; an outline diagram is given of the male genitalia of 36 of the 39 species. Sixteen new species (*adamsi*, *bakeri*, *carabyi*, *carteri*, *dedariensis*, *fraseriensis*, *globosus*, *goerlingi*, *macmillani*, *minutus*, *obscurus*, *polli*, *robustus*, *smythi*, *tamminenensis*, and *watsoni*) are described. Two names, *major* Blackburn and *mastersi* MacLeay, previously regarded as synonyms are revalidated. Two names previously regarded as synonyms are confirmed as such. They are as follows: *meyricki* Blackburn (of *badeni* van de Poll) and *tepperi* Blackburn (of *jansoni* van de Poll). Three names are newly synonymised (the synonym first): *splendens* van de Poll = *mastersi* MacLeay; *simplex* Blackburn = *mastersi* MacLeay; and *strandii* Obenberger = *dilutipes* van de Poll.

Introduction

There are 27 described species of the genus *Astraeus* from Australia and one from New Caledonia. Originally established as *Asthraeus* by LaPorte & Gory (1837), the genus was referred to by that name until Gemminger & de Harold (1869) used *Astraeus*, thus correcting an incorrect transliteration from the Greek. This has been followed by all subsequent authors. Barker (1964) requested the International Commission for Zoological Nomenclature to validate the emendation of *Asthraeus* to *Astraeus* and this was eventually carried out (I.C.Z.N. 1966, Opinion 795). The genus was last revised by van de Poll (1889) who gave excellent descriptions and illustrations of all species known at that time. Presumably van de Poll never saw a live specimen of the genus, so would have been unaware of their unique spring mechanism involving the release of the elytra from the closed position. When the living beetle releases the spring, the elytra flick open with such force that the insect can be projected for up to several metres. The effect is reminiscent of the sternal spring of the Elateridae except that the

same result is achieved in a different way. It has no doubt evolved as an escape mechanism. One other feature has apparently not been commented on in the literature and that is the fact that most of the species exhibit classical warning colouration of yellow markings on a dark background. Whether any of the species are noxious to predators or whether they are Batesian mimics has yet to be determined.

Since van de Poll's excellent monograph, further species have been described and more discovered so that the genus is again in need of revision. This poses some difficulty to an Australian worker as most of the type specimens are housed in overseas museums. Also, through habitat destruction throughout Australia, some of the species are not abundant over their former range, and unfortunately the genus is very poorly represented in museums and in most private collections in this country. The adults of more than half of the species occur on *Casuarina* sp., but some are also associated with species of *Jacksonia*, *Banksia*, *Xanthorrhoea*, *Callitris*, *Melaleuca*, *Acacia*, *Daviesia*, and possibly *Dryandra* and *Hakea*. Adults of the early emerging species can be

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collected in August and adults of some species are present as late as March. More than half of the known species are found in the southern half of Western Australia. The others occur over the rest of the continent excluding the desert and northern-most tropical areas. One species occurs on New Caledonia. The genus is unknown from Tasmania.

In this paper male genitalia have not been used to diagnose the species, but have been used as one character to place the species into related groups.

This revision is based mainly on collections made by the author in New South Wales, South Australia and Western Australia between 1962-1975, now housed in the South Australian Museum. The remaining specimens are scattered throughout the collections listed below. The abbreviations used in the text for museum and private collections are as follows:

EA	Collection of Mr E. E. Adams, Edungalba, Queensland.
AM	The Australian Museum, Sydney
ANIC	The Australian National Insect Collection, C.S.I.R.O., Canberra.
BPBM	The Bernice P. Bishop Museum, Honolulu.
BM	The British Museum (Natural History), London.
KC	Collection of Mr and Mrs K. Carnaby, Wilga, Western Australia.
JH	Collection of Mrs J. Harslett, Amiens, Queensland.
MM	The MacLeay Museum, Sydney (types on permanent loan to ANIC).
MNHN	Museum National d'Histoire Naturelle, Paris.
NM	The National Museum of Victoria, Melbourne.
NMP	National Museum, Prague.
QM	The Queensland Museum, Brisbane.
SAM	The South Australian Museum, Adelaide.
WADA	The Western Australian Department of Agriculture, South Perth.
WAM	The Western Australian Museum, Perth.

The Australian Buprestidae have been divided into six sub-families (Britton 1970). *Astraeus* belongs in the sub-family Buprestinae, the members of which have mouthparts not produced downwards to form a rostrum. In the sub-tribe Buprestes the metathoracic epimera are completely exposed whereas in the Anthaxiae they are totally or partially covered by the lateral extension of the abdo-

men. *Astraeus* is placed in the sub-tribe Buprestes with nine other genera found in Australia. *Astraeus* and *Neobuprestis* both have an indistinct scutellum, but *Neobuprestis* has an exposed pygidium whereas in *Astraeus* it is covered by the elytra. All of the other Australian members of the sub-tribe have a distinct scutellum. They are: *Nascioides*, *Nascio*, *Neobubastes*, *Noiobubastes*, *Bubastes*, *Buprestina*, *Buprestodes* and *Euryspilus* (Carter 1929).

Taxonomy

Genus *ASTRAEUS* LaPorte & Gory

Astraeus LaPorte & Gory, 1837: 1, pl. 1, fig. 1. (Invalidated, Opinion 795.) Imhoff, 1856: 46. Lacordaire, 1857: 43. Saunders, 1868: 10, pl. 1, fig. 12.

Astraeus: Gemminger & de Harold, 1869: 5: 1380. Saunders, 1871: 43. Masters, 1871: 124. MacLeay, 1873: 239-240. Kerremans, 1885: 136. van de Poll, 1886: 176-178. Masters, 1886: 71. van de Poll, 1889: 79-110, pls 2, 3, figs 1-19. Blackburn, 1890: 1256-1258; 1891: 496. van de Poll, 1892: 67-68. Kerremans, 1892: 101-102. Blackburn, 1892: 211-213; 1894: 101; 1895: 45-46. Kerremans, 1900: 295-296; 1902: 148-149. Fauvel, 1904: 116. Carter, 1925: 229, fig. 1. Obenberger, 1928: 204-205. Carter, 1929: 265, 282, 302, pl. 33, fig. 43. Obenberger, 1930: 265-367. Carter, 1933: 41. Obenberger, 1936: 133. Barker, 1964: 306-307. I.C.Z.N., 1966: 269-270.

Astraeus: Carter, 1929: 270.

Type species. *Astraeus flavipictus* LaPorte & Gory, 1837 (by monotypy).

Generic description

Head. Medium size or large; the surface pitted; with a median longitudinal impressed line on the basal half; clypeus short, the apical margin with a bow-shaped indentation; labrum incised; antennal cavities small and rounded, situated near the lower internal corner of the eyes.

Antennae. The first segment longer than any of the rest, rounder and thicker at the apex than at the base; 2nd segment short and obconic; 3rd segment longer than the 2nd but not as long as the first, also obconic; 4th segment slightly shorter than the 3rd, dorsoventrally flattened, the front edge projecting outwards to form a tooth; the remaining segments, except the last, similar in structure to the 4th and each slightly smaller than the succeeding segment; the last segment flattened but not

toothed. In species belonging to *Astraeus* (*sensu stricto*) the antennae are sexually dimorphic, being longer in males than in females, due to the segments after the 3rd being of approximately equal length, whereas in females they become progressively shorter. In *Astraeus* (*Depollus*) the antennae do not show sexual dimorphism and are short in both sexes.

Pronotum. Surface pitted; wider than long; dorsally convex; rounded at the sides and narrower at the apex than at the base; a deep notch occurs on either side of the middle, at the base. In all but one species a small spindle-shaped depression is present at the base of the median lobe. I have called this structure the basal crypt (Fig. 24).

Scutellum. Invisible.

Elytra. Convex dorsally, each side with a crescent-shaped lobe fitting over the notches in the base of the pronotum; the apex of each elytron ends (with rare exceptions) in a sharp point, the sutural spine, usually formed by a crescent-shaped lateral emargination which forms on the inner edge a smaller lateral tooth, usually called the marginal spine; if the lateral emargination is absent, so is the marginal spine; below the shoulder the external margin is dilated, sometimes the dilation is rounded posteriorly, sometimes strongly projected backwards and angled forming a point, the whole being folded inwards and covering part of the metasternal coxae—this structure is called the humeral fold (Fig. 1); punctate-striate and in many cases also costate; there is a curved lip on the anterior undersurface of each elytron which fits over an opposite curved projection on the mesothorax, together forming the catch of a spring escape mechanism.

Undersurface. Variably pitted; anterior edge of prosternum straight or crescent-shaped and a large prosternal process; mesosternum short; metasternum approximately equal in length to the prosternum; posterior margins of coxae and abdominal sternites glabrous.

Legs. Femur slightly dorsoventrally flattened but robust; tibia almost cylindrical but longer than the femur; 1st tarsal segment longer than the remaining segments which become progressively shorter.

Body outline. Laterally teardrop-shaped, the apex being constricted; dorsally convex; ventrally straight at the anterior end and curving upwards at the end of the abdomen, rarely concave.

Key to the sub-genera of *Astraeus*

1. Lateral lobes of pronotum projecting from the elytral edge line; elytra striate-punctate but never with longitudinal costae; humeral fold rounded *Astraeus* (*Depollus*)
1. Lateral lobes of pronotum confluent with the elytral edge line; elytra striate-punctate with well or poorly developed longitudinal costae; humeral fold angled (Fig. 1) *Astraeus* (*sensu stricto*)

Sub-genus *Depollus* sub-gen. nov.

Type species *Astraeus aberrans* van de Poll, 1886.

Head medium sized. Antennae short. Pronotum notched on both sides at the base, with a median lobe pointed and projecting, the lateral lobes with the posterior margin curved upwards and outwards. Elytra striate-punctate, the edges of the striae never costate. The suture ends posteriorly in a short or very short spine which may be blunt or pointed and curved outwards. With no marginal spine or in one species with a very short, blunt marginal spine. The humeral fold is rounded and poorly developed. Only known to occur in Western Australia.

Key to the species of *Astraeus* (*Depollus*)

1. Basal colour brown 1. *polli* sp. nov.
1. Basal colour black 2
2. Elytra with 4 longitudinal red vittae 5. *lineatus* van de Poll
2. Elytra without longitudinal red vittae 3
3. Head, pronotum and undersurface very hairy 4
3. Head, pronotum and undersurface not very hairy 5
4. Pronotum with clumps of hair emerging from depressions towards the sides; no marginal spine 3. *robustus* sp. nov.
4. Pronotum with hair emerging singly, not clumped; small marginal spine 4. *aberrans* van de Poll
5. Head and pronotum with deep punctures closely packed together 2. *tamminensis* sp. nov.
5. Head and pronotum with shallow, separated punctures 6
6. Pronotum laterally inflated, elytral pattern numerous strigiform spots 6. *multinotatus* van de Poll
6. Pronotum not laterally inflated, elytral pattern small and large spots and longitudinal vittae 7
7. Sutural spine well developed and outcurving 7. *irregularis* van de Poll
7. Sutural spine poorly developed and not outcurving 8. *deduriensis* sp. nov.

1. *Astraeus* (*Depollus*) *polli* sp. nov.

FIGS 2, 22A

Types

Holotype: ♂, Wongan Hills, W. Aust., on *Casuarina campestris*, 9.1.1971, S. Barker, SAM. I 20940.

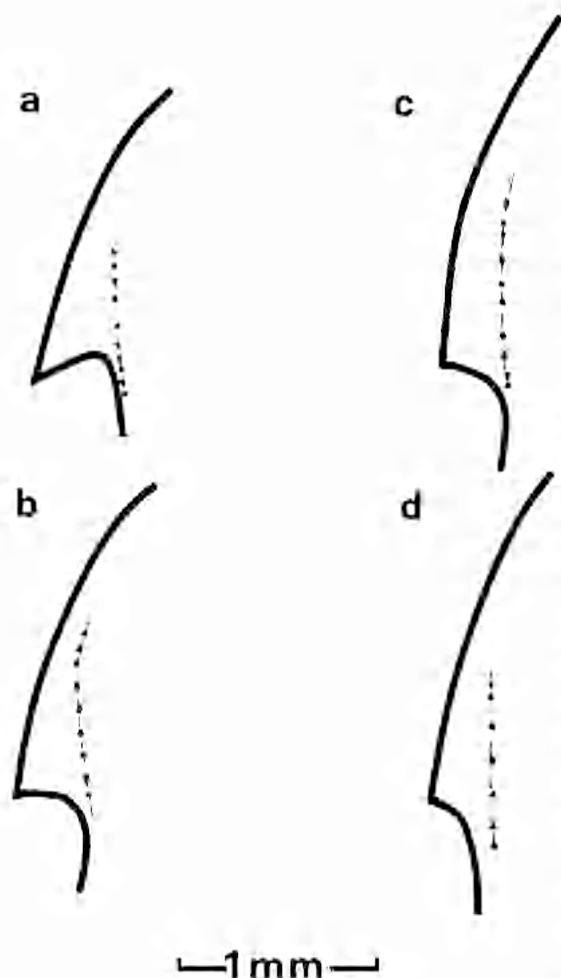


Fig. 1. Outline diagram of the left humeral fold of 4 species of *Astraeus*. The head end of each is to the top of the page and the left side is uppermost. Note that the specimens figured are all females and that (a) and (b) were smaller specimens than (c) and (d). Each structure is categorised as in the text. (a) *A. mastersi* MacLeay — well developed, acutely angled. (b) *A. samouelli* Saunders — well developed, angled. (c) *A. intricatus* Carter — moderately developed, angled. (d) *A. carnabyi* sp. nov. — poorly developed, slightly angled.

Allotype: ♀, Wongan Hills, W. Aust. on *C. campestris*, 9.i.1971, S. Barker, SAM, I 20941.

Paratypes: 1 ♂ & 1 ♀, 2 km W of Wongan Hills, W. Aust. on *C. campestris*, 20.i.1973, S. Barker, EA; 5 ♂ & 4 ♀, Wongan Hills, W. Aust. on *C. campestris*, 9.i.1971, S. Barker, ANIC (1 ♂ & 1 ♀), BM (1 ♂ & 1 ♀), MNHN (1 ♂ & 1 ♀), SAM (2 ♂ & 1 ♀); 1 ♂, Dedari,

W. Aust., 12.i.1948, J. A. Douglas, NM; 1 ♂, Dedari, W. Aust., WADA; 2 ♂, South Tamin Flora Reserve, W. Aust. on *C. campestris*, 6.i.1971 & 9.i.1971, S. Barker, WAM.

Colour. Shiny. Head brown with the following yellow markings: two lunettes from the inner corner of the eye, concave towards the base of the antennae but not reaching the middle of the head; behind each of the former at the base is a single small spot; a small spot at the base behind each eye; an elongate band runs from the anterior underside of the eye almost to the base; there is a large spot on each side of the gular; antennae brown. Pronotum brown with blue reflections and the following yellow markings: close to the anterior margin on each side of the centre, but not reaching it, is a laterally elongate mark; in the same line, directly behind the eye, is a smaller laterally elongate spot; towards the base, in the middle of each side, there is a longitudinally elongate spot, and between them a small median longitudinally elongate spot; laterally there is a longitudinally elongate spot commencing just after the middle, running to the base, which is flared outwards with a dark rim and the exposed inner surface is yellow. Elytra brown with blue reflections: the intervals between the striae are irregularly mottled with yellow, more so at the base than at the apex; the sutures, apical spines, and the lateral and anterior margins of the elytra are black but elsewhere brown. Undersurface brown: the mesosternum and metasternum each have lateral yellow patches and each of the abdominal segments have lateral yellow spots; the coxal plates each have a yellow spot near the centre but not touching it; hairs silver. Legs: femur and tibia, brown with blue reflections; tarsi dark brown with blue reflections.

Shape and sculpture. Head with shallow punctures, except for a median longitudinal glabrous line commencing between the eyes and confluent with the basal impressed line; with short sparse hairs. Pronotum with shallow punctures in the middle becoming confluent at the sides, except for two small round glabrous areas in the centre of each half; a short impressed line projecting forwards from the basal crypt; sides rounded and narrowed from base to apex. Elytra with the intervals between the striae slightly convex and transversely strigose with shallow punctures; parallel-sided until after the middle then rounded to the base; with a small sutural spine projecting laterally. Undersurface with shallow punctures,

denser at the sides than in the middle; with a few short hairs.

Size. Males $10.5 \pm 0.15 \times 3.8 \pm 0.07$ mm (18). Females $11.5 \pm 0.27 \times 4.0 \pm 0.09$ mm (18).

Distribution. Western Australia.

General remarks. Named after the late J. R. H. Neervort van de Poll.

Specimens examined. W. Aust.: Types; 5 ♂ & 3 ♀, 13 km N of Goomalling, on *Casuarina campestris*, 9.i.1971, S. Barker; 1 ♂ & 1 ♀, Waddington, on *C. campestris*, 9.i.1971, S. Barker; 1 ♂ & 2 ♀, Dedari, on *C. campestris*, 20.xii.1972, S. Barker; 3 ♂ & 3 ♀, 2 km W of Wongan Hills, on *C. campestris*, 20.i.1973, S. Barker.

2. *Astraeus (Depollus) tamminensis* sp. nov.

FIGS 3, 22B

Type.

Holotype: ♂, South Tammin Flora Reserve, W. Aust. on *Casuarina campestris*, 6.i.1971, S. Barker, SAM, I 20438.

Colour. Head and pronotum dull, elytra shiny. Head black, bottoms of most of the punctures yellow with the following yellow markings: two small elongate spots each between the eye and above the base of the antennae; laterally a small round spot between the eye and the base of the head; ventrally all yellow, almost continuous under the eye with the first mentioned spot; antennae dark brown with blue reflections. Pronotum black, bottoms of most of the punctures yellow, with the following yellow markings: a thin median longitudinal line from base to apex covering all but the tip of the median lobe; two longitudinal stripes on each side of the first, curving inwards from the base but ending before the apex, each capped with a circular spot near the apex; a thicker lateral stripe runs from the base to the apex; underside with alternate irregular stripes of black and yellow, the yellow predominating. Elytra with alternate black and yellow longitudinal stripes broken irregularly, their breadth conforming to the intervals between the striae; predominantly black along the suture and the outer margin, yellow in the middle. Undersurface mainly yellow with irregular black markings along the middle of each side across the outer margins of the abdominal sclerites and at the apex, the black markings all with brassy metallic gleams; hairs silver. Legs dark brown with blue reflections; each femur with elongate yellow markings on both surfaces.

Shape and sculpture. Head with dense, uniformly deep punctures. Pronotum with uniformly dense punctures; more or less parallel-

sided but abruptly rounded at the apex. Elytra with the intervals between the striae transversely wrinkled, and deeply and densely punctured; parallel-sided from base to behind the middle then uniformly rounded in the area where marginal spines occur in the other sub-genus, then straight sided to the apical spine which is minute. Undersurface closely and evenly punctured; with a few short hairs. Size. Male 11.3×4.1 mm (1).

Distribution. Western Australia.

General remarks. This species shows closest affinity with *Astraeus polli*.

Specimens examined. Type only.

3. *Astraeus (Depollus) robustus* sp. nov.

FIGS 21, 22C

Types.

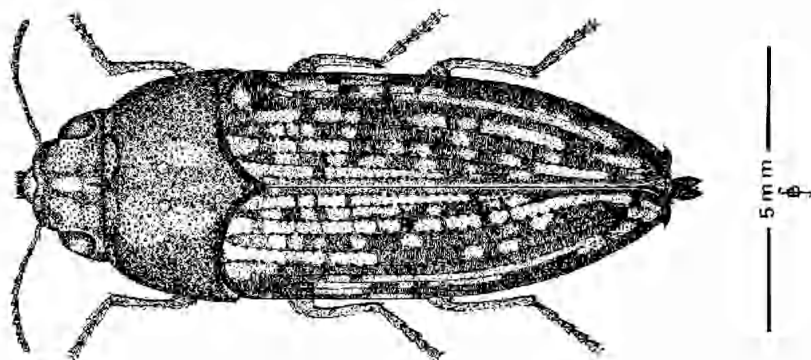
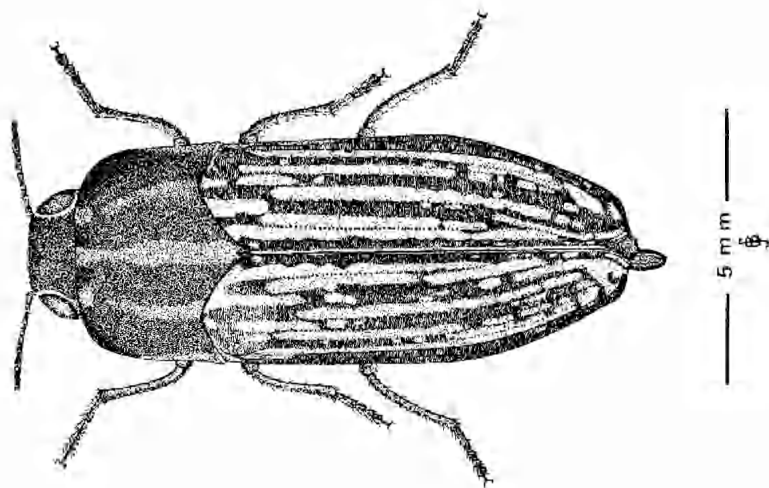
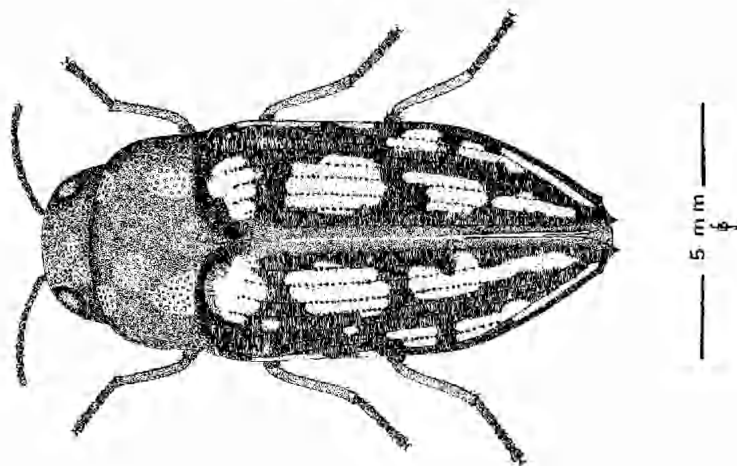
Holotype: ♂, Payne's Find, W. Aust., on *Casuarina dielsiana*, 17.ix.1970, S. Barker, SAM, I 20942.

Allotype: ♀, Payne's Find, W. Aust., on *C. dielsiana*, 17.ix.1970, S. Barker, SAM, I 20943.

Paratypes: 1 ♂, Payne's Find, W. Aust., on *C. dielsiana*, 17.ix.1970, S. Barker, ANIC; 1 ♀, Payne's Find, W. Aust., on *C. dielsiana*, 17.ix.1970, S. Barker, BM; 1 ♂ & 1 ♀, 383 km along Payne's Find Rd, W. Aust. on *C. dielsiana*, 17.ix.1970, S. Barker, MNHN; 1 ♂, Payne's Find, W. Aust. on *C. dielsiana*, 17.ix.1970, S. Barker, WAM.

Colour. Shiny. Head, pronotum and elytra black with purple reflections. Antennae black with blue and purple reflections. Elytra with the following yellow markings: a longitudinal spot in the 2nd outermost interstice near the shoulder and another just before the middle; a similar but larger spot lies on the 5th outermost interstice after the middle but not reaching the apex; a large round spot before the middle with the width of the 3rd-6th interstice from the suture; a variable number of small spots at the base of the elytra in the middle, the maximum number is four per side but they are absent in some specimens. Undersurface black with purple reflections; hairs silver. Legs brown: the joint between the femur and tibia black on the upper surface; 1st tarsal segment brown at the base and black at the apex as are the remainder.

Shape and sculpture. Head with dense shallow punctures; with a glabrous longitudinal median line between the eyes confluent with the basal impressed line; hairy. Pronotum sparsely and shallowly punctured in the middle where the depressions are small but greatly increase in size laterally where the non-depressed areas

Fig. 2. *Astraeus polli* sp. nov.Fig. 3. *Astraeus lammicus* sp. nov.Fig. 4. *Astraeus dedariensis* sp. nov.

are glabrous; sides gradually rounded from base to apex; hairy, with hairs emerging singly in the middle and in clumps from the lateral depressions. Elytra with intervals between the striae slightly convex; more or less parallel-sided from base to just after the middle, then rounded gradually to the apex; with sharp sutural spines; hairy. Undersurface covered with punctures, shallow in the middle, deeper and denser at the sides; hairy, the hairs on the prosternal process and prosternum noticeably longer than elsewhere.

Size. Males $15.9 \pm 0.31 \times 5.6 \pm 0.16$ mm (4). Females $17.0 \pm 0.90 \times 6.0 \pm 0.25$ mm (3).

Distribution. Western Australia.

Specimens examined. Types only.

4. *Astraeus (Depollus) aberrans* van de Poll, 1886: 176; 1889: 84, 90, 91, pl. 2, fig. 4, 4a. Kerremans, 1892: 101; 1902: 148. Carter, 1929: 282. Obenberger, 1930: 365.

Astraeus aberrans var. *picicollis* van de Poll, 1889: 91. Kerremans, 1892: 101; 1902: 148. Carter, 1929: 282. Obenberger, 1930: 365.

FIG. 22D

Type. MNHN (not seen by author).

Colour. Shiny. Head, pronotum and elytra black with purple reflections; antennae black with blue and purple reflections. Elytra with the following yellow markings: a small irregular number of elongate markings each being restricted to the width of one interval between striae and occurring mainly in three areas: near the suture; in the middle of the elytra; next to the anterior part of the outer margin. Undersurface metallic purple, the lateral margin of the 1st, 2nd and 3rd abdominal segments each with a yellow spot which is variable in size and absent from the 3rd segment in some specimens; hairs silver. Legs dark with blue and purple reflections.

Shape and sculpture. Head deeply punctured, in parts in the middle less so than at the sides, the areas involved glabrous; with a longitudinal glabrous line between the eyes merging with the basal impressed line; very hairy. Pronotum with large deep punctures dispersed but more so in the middle with the elevated parts glabrous; mostly parallel-sided but abruptly rounded and narrowed at the apex; anterior margin projecting forwards in the middle; very hairy at the sides, the hairs emerging singly, not in clumps. Elytra with the intervals between the striae convex and slightly wrinkled, each with two longitudinal rows of small hairs; parallel-sided, rounded after the

middle to the small marginal spine; sutural spine small. Undersurface evenly and shallowly punctured; hairy.

Size. Males $14.0 \pm 0.2 \times 4.9 \pm 0.09$ mm (25). Females $16.6 \pm 0.43 \times 5.8 \pm 0.17$ mm (11).

Distribution. Western Australia.

General remarks. This species shows closest affinity with *Astraeus robustus*.

Specimens examined. W. Aust.: 1 ♂, Carnamah, 30.ix.1965, E. Baker; 12 ♂ & 6 ♀, 5 km W of Payne's Find on *Casuarina* sp., 17.ix.1970, S. Barker; 2 ♂, 106 km S of Payne's Find on *Casuarina corniculata*, 18.ix.1970, S. Barker; 2 ♀, Wialki on *C. corniculata*, 19.ix.1970, S. Barker; 1 ♂, Wialki on *Casuarina campestris*, 21.ix.1970, S. Barker; 1 ♂, South Tammin Flora Reserve on *C. campestris*, 30.ix.1970, S. Barker; 3 ♂ & 4 ♀, South Tammin Flora Reserve on *C. campestris*, 8.xi.1970, S. Barker; 3 ♂ & 1 ♀, Quairading on *C. campestris*, 7.xi.1970, S. Barker.

5. *Astraeus (Depollus) lineatus* van de Poll, 1889: 84, 87-89, pl. 2, figs 2, 2a. Kerremans, 1892: 102; 1902: 149. Carter, 1929: 282. Obenberger, 1930: 366.

FIG. 22E

Type. Holotype, MNHN (not seen by the author).

Colour. Head and pronotum dull, elytra shiny. Head black with bronze-green reflections in the middle at the base, the rest with purple reflections; with or without a red spot underneath each eye; antennae black with purple reflections. Pronotum black with bronze-green reflections in the middle, the rest with purple reflections; a thin lateral red stripe on each side; with or without a small red spot on each side of the median lobe near the base. Elytra black with blue reflections and the following red markings: two broad vittae, the first near the margin, but not touching it, running from the shoulder to the preapical area; the second in the middle commencing near the front edge running parallel to the suture, but not touching it, to the preapical area. Each of the vittae may be entire or broken into two or a number of elongate marks. Undersurface metallic purple with lateral red marks on the prosternum, 3rd coxal plate and 1st, 2nd and 3rd abdominal segments. The presternal and 3rd abdominal spots are absent from some specimens; hairs silver. Legs: femur and tibia metallic purple; tarsi brown.

Shape and sculpture. Head evenly punctured with a longitudinal glabrous line between the eyes; hairy. Pronotum evenly punctured, the punctures deeper at the sides than in the

middle; sides narrowed and slightly rounded from the base to near the apex where they are more noticeably rounded; the front edge projecting forwards in the middle; hairs longer and more dense at the sides than in the middle. Elytra with the intervals between the striae convex with shallow punctures and faintly transversely strigose; laterally slightly concave from the shoulders until after the middle, then rounded to the small sutural spine; hairy. Undersurface: prosternum with large punctures, the rest with small shallow punctures, less dense in the middle; hairy.

Sizes. Males $11.0 \pm 0.48 \times 3.8 \pm 0.22$ mm (3). Females $13.0 \pm 0.29 \times 4.6 \pm 0.11$ mm (6).

Distribution. Western Australia.

Specimens examined. W. Aust.: 1 ♂, 5 km W of Payne's Find on *Casuarina* sp., 17.ix.1970, S. Barker; 1 ♂, South Tammin Flora Reserve on *Casuarina campestris*, 30.ix.1970, S. Barker; 2 ♀, Quairading on *C. campestris*, 7.xi.1970, S. Barker; 1 ♂ & 2 ♀, South Tammin Flora Reserve on *C. campestris*, 8.xi.1970, S. Barker; 2 ♀, 13 km N of Goomalling on *C. campestris*, 9.x.1971, S. Barker.

6. *Astraeus (Depollus) multinotatus* van de Poll, 1889: 84, 89, 90, pl. 2, fig. 3, 3a. Kerremans, 1892: 102; 1902: 149. Carter, 1929: 282. Obenberger, 1930: 366.

FIG. 22F

Type. Holotype, MNHN (not seen by the author). *Colour.* Head and pronotum dull, elytra shiny. Upper surface and antennae black with blue reflections. The whole upper surface except the antennae speckled with small yellow spots. Undersurface black with yellow spots larger than on the upper surface; hairs silver. Legs dark brown; each femur with a single elongate spot; the tarsi black.

Shape and sculpture. Head with shallow even punctures and a small glabrous spot between the eyes. Pronotum evenly punctured, the punctures larger at the sides than in the middle; slightly inflated after the middle, rounding and narrowing quickly to the apex; the front edge projects forwards in the middle. Elytra with intervals between the striae convex, punctured and wrinkled; laterally slightly concave, rounding well after the middle to the sutural spines which are turned out. Undersurface evenly punctured, but the punctures larger at the sides than in the middle, the differences pronounced on the thorax. Apart from the legs, apical edges of the abdomen and pronotum, the body is devoid of hair.

Size. Males $12.3 \pm 0.73 \times 4.9 \pm 0.3$ mm (7). Females $15.1 \pm 0.95 \times 6.0 \pm 0.35$ mm (6).

Distribution. Western Australia.

Specimens examined. W. Aust.: 1 ♂, Leonora, H. W. Brown, 2.xi.1934, WAM, 34-511; 1 ♀, 80 km S of Coolgardie, Jan. 1937, A. M. Douglas, WAM, 37-722; 1 ♂ & 1 ♀, Taria Rock, 2.i.1940, A. M. Douglas, WAM, 40-32, 40-31; 2 ♂, Watning, 20.ix.1950, R. P. McMillan, WAM, 73-384, 73-386; 2 ♂ & 1 ♀, Watning, 26.xii.1950, R. P. McMillan, WAM, 73-385, 73-388; 1 ♂ & 2 ♀, WAM, 73-375/7; 1 ♀, Red Gum Pass, Stirling Ranges on *Casuarina* sp., 26.i.1971, E. & K. Carnaby.

7. *Astraeus (Depollus) irregularis* van de Poll, 1889: 84, 86, 87, pl. 2, fig. 1, 1a. Kerremans, 1892: 102; 1902: 149. Carter, 1929: 282. Obenberger, 1930: 366.

FIG. 22G

Type. Holotype, MNHN (not seen by author.)

Colour. Head and thorax dull, elytra shiny.

Male. Head black with blue reflections, with the following yellow markings: a continuous band under the lower half of the eye; an elongate spot in the centre of the head which may be broken into several spots; two elongate spots lateral and basal to the central spot, each of which may be broken into two spots; a small spot on either side of the gular. Except for the central spot, all other spots may be reduced or absent. Antennae dark brown with blue reflections. Pronotum black with blue reflections and the following yellow markings: a spot on the margin of the apical edge on each side of the middle; a spot on each side below the first, towards the base; two spots along the sides, a small one at the apex and an elongate larger one at the base—the first may be absent and the second broken into two spots. All of these spots may be reduced and some or all of them absent. Elytra black with blue reflections, each elytron with the following yellow markings: the basic pattern is of three spots in the middle but not touching the suture; the first is a small elongate spot at the base; the second a large spot before the middle; the third a vitta after the middle and extending to the pre-apical area; there are also two small elongate spots at the margin, one at the shoulder extending to the region of the humeral fold and a smaller one just behind it which is sometimes absent; an irregular number of small spots are present along the basal edge between the vitta and the suture. Undersurface dark brown with blue reflections; with yellow spots at the base of each leg and single lateral spots on the pro-

sternum, third coxal plate and abdominal segments 1-4, 1-3 or 1-2, decreasing in size from first to last; hairs silver. Legs dark brown with blue reflections.

Female. Head, pronotum and elytra basically similar to the male except that the yellow markings are larger and the irregular spots are more numerous. Undersurface and legs as in the male except that lateral spots are present on all the abdominal segments.

Shape and sculpture. Head broad; with shallow punctures larger at the sides than in the middle and a longitudinal glabrous line between the eyes. Pronotum with shallow punctures larger at the sides than in the middle; the lateral margins rounded and narrowed gently at the base, more abruptly at the apex. Elytra with the intervals between the striae slightly convex, with a shallow row of punctures and faintly transversely wrinkled; parallel-sided until after the middle, then rounded to the sutural spine which is well developed and turned out. Undersurface more closely punctured at the sides than in the middle; with a few short hairs.

Size. Males $11.2 \pm 0.24 \times 4.1 \pm 0.08$ mm (11). Females $13.5 \pm 0.22 \times 4.7 \pm 0.08$ mm (20).

Distribution. Western Australia.

Specimens examined. W. Aust.: 3 ♂ & 5 ♀, Gosnells on *Casuarina* sp., 24.xii.1967, S. Barker; 1 ♂ & 2 ♀, Gosnells on *Casuarina* sp., 27.xii.1967, S. Barker; 2 ♂ & 3 ♀, Red Hill Rd near Midland Junction on *Casuarina* sp., 4.i.1968, S. Barker; 2 ♀, 77 km along main York Rd on *Casuarina* sp., 5.i.1968, S. Barker; 3 ♂ & 4 ♀, South Tammin Flora Reserve on *Casuarina huegeliana*, 6.i.1971, S. Barker; 1 ♂ & 2 ♀, 142 km E of Norseman on *C. huegeliana*, 19.xii.1972, S. Barker; 1 ♀, 58 km W of Tammin on York-Tammin Rd on *C. huegeliana*, 23.xii.1972, S. Barker; 1 ♂ & 1 ♀, 3 km E of Gosnells on *C. huegeliana*, 27.xii.1972, S. Barker.

8. *Astraeus (Depollus) dedariensis* sp. nov.

FIGS 4, 22H

Types.

Holotype: ♂, Dedari, W. Aust., H. W. Brown, WAM, 71-1779.

Allotype: ♀, Dedari, W. Aust., H. W. Brown, WAM, 71-1778.

Paratypes: 2 ♀, Dedari, W. Aust., WAM, 40-1207, 40-1208; 1 ♀, Borden, W. Aust., SAM; 1 ♀, Dedari, W. Aust., ANIC; 1 ♀, Dedari, W. Aust., on *Casuarina corniculata*, 21.i.1936, H. W. Brown, MNHN.

Colour. Shiny. Head black with purple reflections and the following yellow markings: an ovoid spot touching the underside of each eye

and pointing downwards but not touching the mouth; a single circular spot in the middle. Antennae brown with blue and purple reflections except for the first segment which is predominantly black. Pronotum black with purple and blue reflections and the following yellow markings: a small ovoid spot on each side at the apex; a larger ovoid spot in the middle of each side at the base, slightly angled outwards on the apical side; laterally there is a line on each side from the apex to the base where it is extended by the flaring outwards of the lateral margin of each lobe exposing the yellow inner surface. Elytra black with purple and blue reflections and the following yellow markings which do not form a symmetrical pattern on each side: a large basal spot; behind and in line a large elongate spot, commencing before the middle and ending at the middle, close to the suture but not touching it; an elongate spot commencing after the middle and running to the apex, close to the suture but not touching it; an elongate spot at the shoulder, not touching the outer margin but close to it; behind the last a much smaller spot not touching the margin; after the middle there are several elongate spots extending almost to the apex but not touching the outer margin; several small eccentric oval spots. Undersurface black with purple reflections; the first three abdominal segments have lateral yellow spots which progressively diminish in size from in front backwards; hairs silver. Legs: mesosternal and metasternal coxae with yellow spots on the outer margins; the rest brown with purple reflections; the upper surfaces of the tarsi are black.

Shape and sculpture. Head with shallow punctures and without hair. Pronotum with shallow punctures; a short median impressed line projects forwards from the basal crypt; parallel-sided at the base, abruptly rounded at the apex; with short hair on the anterior edge only. Elytra with the intervals between the striae slightly convex and transversely strigose; parallel-sided until after the middle then rounding off to the apex; each ending in a thick short spine projecting backwards; no marginal spine but a small mound is present in the region where they occur in other species. Undersurface with shallow punctures; with a few short hairs.

Size. Males 11.2×4.2 mm (1). Females $13.0 \pm 0.15 \times 5.0 \pm 0.1$ mm (6).

Distribution. Western Australia.

General remarks. This species shows closest affinity with *Astraeus irregularis*.

Specimens examined. Types only.

Sub-genus *Astraeus* (sensu stricto) sub-gen. nov.

Type species *Astraeus flavopictus* LaPorte & Gory, 1837.

Description. Head medium sized; with or without a median longitudinal raised ridge between the eyes, the median keel (Fig. 25). Antennae

long. Pronotum deeply notched on both sides at the base, with the median lobe and the two lateral lobes pointed. Elytra striate-punctate and/or costate, the outer edge of the intervals between the striae costate, either down the entire length or towards the apex only. The suture ends posteriorly in a spine and in all but three species these are sharp and curved outwards. The marginal spines are smaller than the sutural spines. The humeral fold is variably developed and angled (Fig. 1).

Key to the species of *Astraeus* (sensu stricto)

- | | |
|--|---------------------------------------|
| 1. Head with a median keel | 2 |
| 1. Head without a median keel | 15 |
| 2. Hairs silver | 3 |
| 2. Hairs yellow | 14 |
| 3. Part or all of the anterior undersurface red-brown | 4 |
| 3. None of the anterior undersurface red-brown | 6 |
| 4. Gular, prosternum, meso- and metasternum, 2nd and 3rd coxae and 1st abdominal segment red-brown | 9. <i>bakeri</i> sp. nov. |
| 4. Prosternum and coxae red-brown | 10. <i>minutus</i> sp. nov. |
| 4. A red-brown area on either side of the prosternal process | 5 |
| 5. Usually shorter than 7.5 mm; humeral fold well developed and acutely angled | 11. <i>fraseriensis</i> sp. nov. |
| 5. Usually longer than 7.5 mm; humeral fold moderately developed and angled | 15. <i>obscurus</i> sp. nov. |
| 6. Most of the leg testaceous | 7 |
| 6. Tips of the tibia and 1st tarsal segment testaceous | 8 |
| 6. None of the leg testaceous | 10 |
| 7. 1st and 2nd legs testaceous except for the outer margin of the femur, 3rd leg testaceous except for the femur | 19. <i>dlutipes</i> van de Poll |
| 7. Tibia, 1st and 2nd tarsal segments testaceous | 13. <i>smeythi</i> sp. nov. |
| 8. Usually shorter than 7 mm | 12. <i>pygmaeus</i> van de Poll |
| 8. Usually longer than 7 mm | 9 |
| 9. Humeral fold well developed, acutely angled | 17. <i>mastersi</i> MacLeay |
| 9. Humeral fold well developed and angled | 18. <i>samouelli</i> Saunders |
| 10. Humeral fold moderately developed and angled | 11 |
| 10. Humeral fold poorly developed, slightly angled | 13 |
| 11. Head and pronotum green and coppery-purple | 21. <i>intricatus</i> Carter |
| 11. Head and pronotum black | 12 |
| 12. Broad and rounded species | 16. <i>globosus</i> sp. nov. |
| 12. Elongate species | 35. <i>watsoni</i> sp. nov. |
| 13. Black species; elytral markings a number of yellow spots | 22. <i>crassus</i> van de Poll |
| 13. Blue species; elytral markings two yellow fascia | 25. <i>fraterculus</i> van de Poll |
| 14. Elytral markings three yellow fascia and red areas | 23. <i>major</i> Blackburn |
| 14. Elytral markings two yellow fascia without red areas | 24. <i>navarchis</i> (Thomson) |
| 15. Body elongate and cylindrical | 16 |
| 15. Body not elongate and cylindrical | 17 |
| 16. Pronotum conically elevated in the middle | 26. <i>prothoracicus</i> van de Poll |
| 16. Pronotum not conically elevated in the middle | 27. <i>elongatus</i> van de Poll |
| 17. Sutural spine with a rounded internal edge | 18 |
| 17. Sutural spine with a straight internal edge | 26 |
| 18. Legs a red-brown colour | 19 |
| 18. Legs not a red-brown colour | 20 |
| 19. Elytral markings spots and fascia | 30. <i>macmillani</i> sp. nov. |
| 19. Elytral markings two vittae on each elytron | 28. <i>vittatus</i> van de Poll |
| 20. Head, pronotum and legs metallic brown or bronze | 29. <i>flavopictus</i> LaPorte & Gory |
| 20. Head, pronotum and legs not metallic brown or bronze | 21 |
| 21. Humeral fold well developed and angled | 22 |
| 21. Humeral fold poorly developed, slightly angled | 23 |
| 22. Head black or coppery-purple; undersurface coppery-purple | 20. <i>adamsi</i> sp. nov. |
| 22. Head blue or green; undersurface blue-green | 14. <i>simulator</i> van de Poll |

23. Basal spot expanded along the front edge of the elytron 31. *carnabyi* sp. nov.
 23. Basal spot not expanded along the front margin of the elytron 24
 24. Elytral markings either two spots and two fascia or the first fascia may be broken making four spots and a fascia on each elytron 32. *badeni* van de Poll
 24. Elytral markings either six spots and a fascia or the fascia may be broken making eight spots on each elytron 33. *jansoni* van de Poll
 24. Elytral markings 7 spots on each elytron 25
 25. Pronotum parallel-sided from base to the middle then strongly rounded and narrowed to the apex; dorsally convex in lateral profile 34. *oberturi* van de Poll
 25. Pronotum gradually rounded at the sides and narrowed from base to apex; dorsally flattened in lateral profile 36. *carteri* sp. nov.
 26. Head slightly excavated between the eyes 37. *goerlingi* sp. nov.
 26. Head deeply excavated between the eyes 27
 27. Head excavated mainly at the base; pronotum laterally inflated with an oval patch of hexagonal cells in the middle 38. *cyaneus* Kerremans
 27. Head excavated mainly at the apex; pronotum not laterally inflated and without hexagonal cells 39. *caledonicus* Fauvel

9. *Astraeus (Astraeus) bakeri* sp. nov.

FIGS 5, 22I

Types.

Holotype: ♂, Dryandra, W. Aust. on *Casuarina huegeliana*, 8.xii.1970, S. Barker, SAM, I 20945.

Allotype: ♀, Dryandra, W. Aust. on *C. huegeliana*, 8.xii.1970, S. Barker, SAM, I 20946.

Paratypes: 1 ♂ & 1 ♀, Dryandra, W. Aust. on *C. huegeliana*, 12.i.1973, S. Barker, EA; 2 ♀, Toompup, W. Aust. on *Casuarina* sp., E. & K. Carnaby, KC; 2 ♀, Dryandra, W. Aust. on *Casuarina* sp., 2.i.1968, S. Barker, SAM; 4 ♂ & 4 ♀, Dryandra, W. Aust. on *C. huegeliana*, 8.xii.1970, S. Barker, ANIC (1 ♂ & 1 ♀), BM (1 ♂ & 1 ♀), MNHN (1 ♂ & 1 ♀), WAM (1 ♂ & 1 ♀).

Colour. Shiny. Head and pronotum black with violet or green reflections; antennae black with metallic blue reflections, tips of first and second segments brown. Elytra black with violet reflections, each with the following yellow markings: a spot at the base; a fascia above the middle, covering the humeral fold and ending near the suture but not touching it, broken into spots in some specimens; a large spot below the middle. Undersurface: gular, pro-meso- and metasternum, second and third coxae and median anterior part of the first abdominal segment all reddish-brown with light blue reflections on the lateral part of the above; remaining abdominal segments black with metallic blue reflections; hairs silver. Legs brown with metallic blue reflections on the upper surface, the end of the first tarsal segment and all of the remaining tarsal segments metallic blue.

Shape and sculpture. Head evenly punctured; small median keel; hairy. Pronotum deeply and evenly punctured, with a median longitudinal impressed line at the apex; median

lobe without a basal crypt; sides rounded and narrowed from base to apex; hairy. Elytra costate, the intervals between flat with a prominent row of punctures; at the sides gently rounded from the base to just before the middle then rounded and narrowed to the strong marginal spine; sutural spine robust; humeral fold well developed and angled. Undersurface sparsely punctate in the middle, more closely at the sides; covered with fine hair which is denser at the sides than in the middle.

Size. Males $7.5 \pm 0.07 \times 3.0 \pm 0.03$ mm (44). Females $7.9 \pm 0.12 \times 3.2 \pm 0.06$ mm (23).

Distribution. Western Australia.

General remarks. Named after Dr F. H. Uther Baker.

Specimens examined. W. Aust.: Types; 18 ♂ & 8 ♀, Dryandra, on *Casuarina huegeliana*, 8.xii.1970, S. Barker; 6 ♂ & 1 ♀, 13 km E of Ongerup, on *C. huegeliana*, 11.i.1973, S. Barker; 8 ♂ & 3 ♀, Dryandra, on *C. huegeliana*, 12.i.1973, S. Barker; 1 ♂, Ponier rockhole 70 km S of Balladonia, on *C. huegeliana*, 5.xii.1974, S. Barker; 3 ♂, Juranda rockhole 106 km S of Balladonia, on *C. huegeliana*, 9.xii.1974, S. Barker; 1 ♂, 115 km S of Balladonia on *Casuarina humilis*, 9.xii.1974, S. Barker; 1 ♂, SW valley of Mt Ragged, on *C. huegeliana*, 10.xii.1974, S. Barker; 1 ♀, 3 km S of Mt Ragged on Israelite Bay road, on *C. humilis*, 10.xii.1974, S. Barker.

10. *Astraeus (Astraeus) minutus* sp. nov.

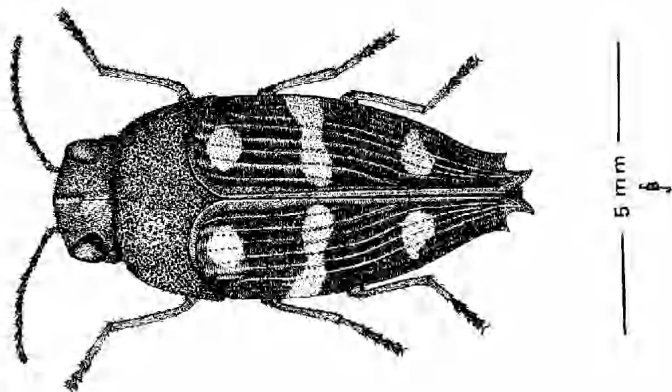
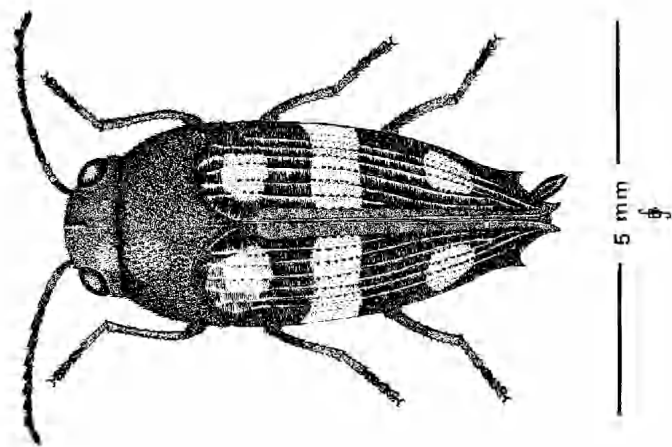
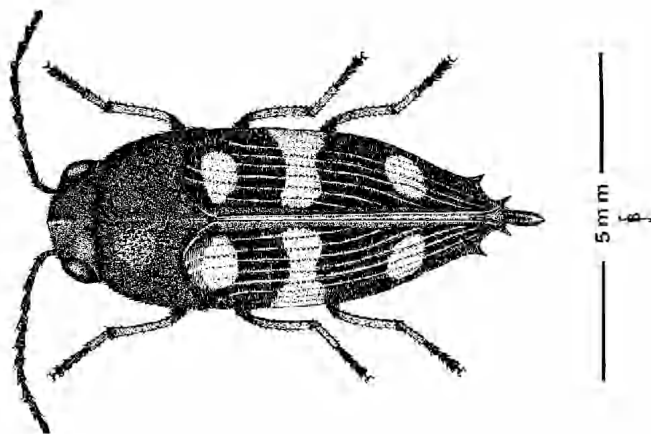
FIGS 6, 22J

Types.

Holotype: ♂, South Tammin Flora Reserve, W. Aust. on *Casuarina huegeliana*, 6.i.1971, S. Barker, SAM, I 20459.

Allotype: ♀, South Tammin Flora Reserve, W. Aust. on *C. huegeliana*, 23.xii.1972, S. Barker, SAM, I 20460.

Paratypes: 2 ♂, South Tammin Flora Reserve, W. Aust. on *C. huegeliana*, 23.xii.1972, S. Barker, ANIC (1), MNHN (1); 1 ♂, South

Fig. 5. *Astracaeus bakeri* sp. nov.Fig. 6. *Astracaeus minutus* sp. nov.Fig. 7. *Astracaeus fraseriensis* sp. nov.

Tammin Flora Reserve, W. Aust. on *C. huegeliana*, 6.i.1971, S. Barker, SAM; 1 ♂, South Tammin Flora Reserve, W. Aust. on *C. huegeliana*, 9.i.1974, S. Barker, BM; 2 ♂, South Tammin Flora Reserve, W. Aust. on *C. campestris*, 9.i.1974, S. Barker, WAM.

Colour. Shiny. Head black with purple reflections; antennae black with blue reflections except for the tips of the first and second segments which are brown. Pronotum black with purple reflections in the middle, red-brown at the sides. Elytra black with purple reflections each with the following yellow markings: a large basal spot; a fascia before the middle covering the humeral fold but not reaching the suture; a large median spot after the middle. Undersurface: prosternum and coxal plates red-brown, the rest black with metallic purple reflections; hairs silver. Legs: upper femur red-brown, the rest of the femur and upper part of the tibia metallic purple; apical part of the tibia and first tarsal segment testaceous; second, third and fourth tarsal segments black with blue reflections.

Shape and sculpture. Head broad; deeply and evenly punctured; with a median keel; hairy. Pronotum deeply and evenly punctured, with a short impressed line projecting forwards from the basal crypt; sides gradually rounded from base to apex; hairy. Elytra costate the intervals flat each with a row of very shallow punctures; laterally tapering gradually from base until after the middle, then rounded to the well-developed marginal spine; a very elongate crescentic emargination between the marginal spine and the well developed sutural spine; humeral fold well developed and acutely angled. Undersurface evenly punctured; hairy.

Size. Males $5.7 \pm 0.22 \times 2.3 \pm 0.10$ mm (7). Females 6.4×2.7 mm (1).

Distribution. Western Australia.

General remarks. The smallest species known at this time.

Specimens examined. Types only.

11. *Astraeus* (*Astraeus*) *fraseriensis* sp. nov.

FIGS 7, 22K, 24, 25

Types.

Holotype: ♂, Fraser Range, W. Aust. on *Casuarina huegeliana*, 19.xii.1972, S. Barker, SAM, 1 20951.

Allotype: ♀, Fraser Range, W. Aust. on *C. huegeliana*, 19.xii.1972, S. Barker, SAM, 1 20952.

Paratypes: 2 ♂ & 2 ♀, Dryandra, W. Aust. on *C. huegeliana*, 12.i.1973, S. Barker, EA (1 ♂ & 1 ♀), MNHN (1 ♂ & 1 ♀); 2 ♂ & 2 ♀, Fraser Range, W. Aust. on *C. huegeliana*

19.xii.1972, S. Barker, ANIC (1 ♂ & 1 ♀), BM (1 ♂ & 1 ♀); 1 ♂, Lake Grace, W. Aust., 9.i.1972, E. & K. Carnaby, KC; 3 ♂, Fyre Highway 142 km E of Norseman, W. Aust. on *C. huegeliana*, 19.xii.1972, S. Barker, SAM; 2 ♂ & 1 ♀, South Tammin Flora Reserve, W. Aust. on *C. huegeliana*, 6.i.1971, S. Barker, WAM.

Colour. Shiny. Head, antennae and pronotum black with violet and blue reflections. Elytra black with purple reflections, each with the following yellow markings: a large basal spot in the middle; a fascia covering the humeral fold, running towards the suture but not touching it, and slightly concave towards the base; a large spot after the middle not touching the suture or the margin; sometimes there is a preapical spot. Undersurface metallic purple except for a red-brown patch on either side of the prosternal process at the anterior edge of the prosternum; hairs silver. Legs: femur metallic purple, tibia and first tarsal segment predominantly testaceous, second, third and fourth tarsal segments dark with blue reflections.

Shape and sculpture. Head closely and evenly punctured; with a median keel; hairy. Pronotum closely and evenly punctured with a slightly excavated median longitudinal line projecting forwards from the basal crypt; rounded at the sides and narrowed from base to apex; hairy. Elytra costate, the intervals between flat, each with a row of punctures; parallel-sided until after the middle then gently rounded and narrowed to the marginal spine; both spines well developed; humeral fold well developed and acutely angled. Undersurface shallowly punctured in the middle, punctures deeper at the sides; hairy.

Size. Males $6.7 \pm 0.05 \times 2.6 \pm 0.02$ mm (72). Females $7.0 \pm 0.08 \times 2.8 \pm 0.04$ mm (28).

Distribution. Western Australia.

General remarks. The three species *Astraeus bakeri*, *Astraeus minutus* and *Astraeus fraseriensis* show a close affinity to each other.

Specimens examined. W. Aust.: Types: 1 ♀, 58 km W of Tammin on York-Tammin Rd, on *Casuarina huegeliana*, 23.xii.1972, S. Barker; 1 ♂, 58 km W of Tammin on York-Tammin Rd, on *C. huegeliana*, 9.i.1974, S. Barker; 2 ♂, South Tammin Flora Reserve, on *C. huegeliana*, 23.xii.1972, S. Barker; 4 ♂ & 2 ♀, South Tammin Flora Reserve, on *C. huegeliana*, 9.i.1974, S. Barker; 31 ♂ & 6 ♀, Coragana rockhole 66 km S of Balladonia, on *C. huegeliana*, 5.xii.1974, S. Barker; 18 ♂ & 13 ♀, Ponier rockhole 70 km S of Balladonia, on *C. huegeliana*, 5.xii.1974, S. Barker; 5 ♂, Juranda rockhole 106 km S of Balladonia, on *C. huegeliana*, 9.xii.1974, S. Barker; 1 ♂, 19

km W of Balladonia, on *C. humilis*, 23.ii.1975, S. Barker.

12. *Astraeus (Astraeus) pygmaeus* van de Poll, 1886: 178-180; 1889: 85, 104, 105, pl. 3, figs 16, 16a, 16c, Blackburn, 1891: 496, van de Poll, 1892: 67, 68, Obenberger, 1930: 366, Carter, 1931: 107; 1933: 41.

Astraeus pygmaeus var. *subfasciatus* van de Poll, 1886: 178-180; 1889: 104, 105, pl. 3, fig. 16b, Obenberger, 1930: 366.

Astraeus samonellei var. *pygmaeus*, Blackburn, 1890: 1256.

Astraeus samonellei var. *pygmaeus*, Kerremans, 1892: 102.

Astraeus pygmaeus, Kerremans, 1902: 148.

Astraeus pygmaeus var. *subfasciatus*, Kerremans, 1902: 148.

Astraeus pygmaeus, Carter, 1929: 282.

Astraeus pygmaeus var. *subfasciatus*, Carter, 1929: 282.

FIG. 221.

Type. Holotype: ♀, Queensland, MNHN (seen by author).

Colour. Male. Turquoise with golden-green reflections at the apex, dark at the base with purple reflections; antennae dark with blue reflections. Pronotum dark in the middle with golden-green and purple reflections, turquoise at the sides with golden-green reflections. Elytra black with blue reflections, each with the following yellow markings: a spot at the base; a fascia covering the humeral fold, slightly concave towards the base but not touching the suture; a spot after the middle, not touching the margin or the suture. Undersurface metallic turquoise in the middle, metallic blue at the sides; hairs silver. Legs metallic blue; tips of tibia and first tarsal segment testaceous; tarsal segments 2, 3 and 4 dark brown with blue reflections.

Female. Head blue at the apex, dark at the base with purple reflections; antennae black with blue reflections. Pronotum black in the middle with purple reflections, blue at the sides. Elytra as in the male except that the fascia is always broken in the middle to form two spots, and all of the yellow markings are smaller than those in the male. Undersurface deep metallic blue; hairs silver. Legs deep metallic blue; tips of the tibia and first tarsal segment testaceous.

Shape and sculpture. Head evenly and closely punctured; with a median keel; hairy. Pronotum closely punctured, the punctures larger at the sides than in the middle; parallel-sided from the base until just before the middle then rounded and tapered to the apex; hairy. Elytra culate, the intervals flat, each with a row of

punctures and transversely wrinkled; parallel-sided until after the middle then rounded and tapered to the marginal spine; both spines well developed; humeral fold well developed and angled. Undersurface: prosternal punctures larger at the sides than in the middle, punctures uniform on the abdomen; hairy.

Size. Males $6.2 \pm 0.05 \times 2.5 \pm 0.02$ mm (66). Females $6.6 \pm 0.08 \times 2.6 \pm 0.04$ mm (40).

Distribution. Queensland and New South Wales.

Specimens examined. Qld.: Type: 1 ♂ & 1 ♀, Edungalba on *Casuarina* sp., 14.xi.1971, E. E. Adams; 8 ♂ & 4 ♀, Edungalba on *Casuarina* sp., 9.xi.1974, E. E. & S. Adams; 1 ♂ & 1 ♀, Edungalba on *Casuarina* sp., 15.xii.1974, E. E. & S. Adams. N.S.W.: 41 ♂ & 19 ♀, Oranmeir on *Casuarina littoralis*, 9.xii.1962, S. Barker; 2 ♂ & 2 ♀, Major's Creek on *C. littoralis*, 26.i.1963, S. Barker. A.C.T.: 3 ♂ & 1 ♀, Mt Ainslie on *Casuarina stricta*, 29.xi.1962, S. Barker; 6 ♂ & 2 ♀, Mt Ainslie on *C. stricta*, 26.xii.1962, S. Barker; 4 ♂ & 3 ♀, Tuggeranong on *C. stricta*, 1.i.1963, S. Barker.

13. *Astraeus (Astraeus) smythi* sp. nov.

FIGS 8, 22M

Types.

Holotype: ♂, Maryborough, Qld, November 1956, E. Smith, WAM, 73-55.

Allotype: ♀, WAM, 73-56.

Paratypes: 2 ♀, Qld, E. Sutton, QM; 1 ♂, SAM.

Colour. Male. Head: apex blue with golden-green reflections, base dark blue with purple reflections; antennae black with blue and purple reflections. Pronotum black in the middle with purple reflections, blue at the sides with golden-green reflections. Elytra black with purple reflections each with the following yellow markings: a spot at the base; a broad fascia covering the humeral fold, running transversely towards the suture but not touching it; a fascia commencing after the middle at the margin, running transversely to the suture but not touching it. Undersurface metallic blue; hairs silver. Legs metallic blue; tibia and first and second tarsal segments testaceous; third and fourth tarsal segments dark brown. A small preapical spot may or may not be present.

Female. Head: apex turquoise, base green; antennae black with blue and green reflections. Pronotum green in the middle, turquoise at the sides. Elytra black with blue and purple reflections, yellow markings as described in the male but less prominent. Undersurface and legs as in the male.

Shape and sculpture. Head evenly punctured; a median keel; hairy. Pronotum with punctures larger at the sides than in the middle; a faint longitudinal impressed line commences at the middle and runs to the apex; parallel-sided from the base to just before the middle then rounded and tapered to the apex. Elytra costate, the intervals between flat each with a row of punctures and faintly transversely wrinkled; parallel-sided until before the middle, then rounded and tapered to the marginal spine; both spines well developed; humeral fold well developed and angled. Undersurface: prosternal punctures shallow in the centre, deeper at the sides; punctures on the abdominal sternites sparser and shallower; hairy.

Size. Males $6.5 \pm 0.08 \times 2.6 \pm 0.15$ mm (2). Females $6.5 \pm 0.18 \times 2.6 \pm 0.01$ mm (4).

Distribution. Queensland.

General remarks. *A. smythi* shows close affinity with *A. pygmaeus*. I place these species alongside the previous group of three species. Named after my late colleague, Dr M. Smyth.

Specimens examined. Qld: Types: 1 ♀, One Tree Hill, Brisbane, 1920, F. Muir, BPBM.

14. *Astraeus (Astraeus) simulator* van de Poll, 1889: 85, 102, 104, pl. 3, figs 15, 15a, 15b. Kerremans, 1892: 102, 1902: 148. Carter, 1929: 282. Obenberger, 1930: 366.

FIG. 22N

Type. Holotype: ♀, Peak Downs, MNHN (seen by author).

Colour. Male. Shiny. Head green at the apex with golden-green reflections, black at the base with blue reflections; antennae black with golden-green and blue reflections. Pronotum black with blue and purple reflections. Elytra black with turquoise reflections, each with the following markings: a large basal spot; a fascia covering the humeral fold, running transversely towards the suture but not touching it, concave towards the base and clubbed at the end; a fascia after the middle running transversely from the margin but not touching the suture. Undersurface metallic blue; hairs silver. Legs metallic blue; tips of tibia and first tarsal segment brown; second, third and fourth tarsal segments black with blue reflections.

Female. Head black with blue reflections; antennae black with blue-green reflections. Pronotum black with blue reflections. Elytra black with blue and purple reflections. The rest as in the male.

Shape and sculpture. Head with close uniform punctures; no median keel; hairy. Pronotum evenly punctured; basal third parallel-sided then slightly rounded and narrowed to the apex; anterior margin projecting forward in the middle, that general area glabrous; hairy. Elytra costate, the intervals between flat but slightly wrinkled; parallel-sided from the base, rounded before the middle then tapering to the marginal spine; both spines well developed; humeral fold well developed and angled. Undersurface evenly punctured; hairy.

Size. Males $6.7 \pm 0.10 \times 2.5 \pm 0.05$ mm (11). Females $7.0 \pm 0.24 \times 2.7 \pm 0.09$ mm (6).

Distribution. Queensland.

General remarks. Of the 17 specimens I have examined, 7 ♂ and 2 ♀ have preapical spots on the elytra, the other eight specimens have no preapical spots. Although male genitalia (Fig. 22N) is similar in shape to the previous two groups of species, the external morphology of *A. simulator* is dissimilar to those five species. Because of this I do not group it with any of the above mentioned species.

Specimens examined. Qld: Type: 1 ♂, 3.xii.1971, E. E. Adams, KC; 4 ♂ & 1 ♀, Edungalba on *Casuarina equisetifolia*, 11.xii.1973, E. E. Adams, SAM (1 ♂ & 1 ♀), EA (3); 1 ♀, Edungalba on *C. equisetifolia*, 15.xii.1973, E. E. Adams, EA; 2 ♂, Edungalba on *Casuarina* sp., 1 on each of 23.xi.1974 and 8.xii.1974, E. E. & S. Adams, EA; 1 ♀, Edungalba on *Casuarina* sp., 30.xi.1974, E. E. & S. Adams, EA; 2 ♂ & 2 ♀, Edungalba on *Casuarina* sp., 14.xii.1974, E. E. & S. Adams, EA; 2 ♂, Edungalba on *Casuarina* sp., 15.xii.1974, E. E. & S. Adams, EA.

15. *Astraeus (Astraeus) obscurus* sp. nov.

FIGS 9, 22O

Types.

Holotype: ♂, Fraser Range, W. Aust., on *Casuarina heugeliiana*, 19.xii.1972, S. Barker, SAM, I 20957.

Allotype: ♀, Fraser Range, W. Aust., on *C. heugeliiana*, 19.xii.1972, S. Barker, SAM, I 20958.

Paratypes: 2 ♂ & 2 ♀, Eyre Highway 142 km E of Norseman, W. Aust. on *C. heugeliiana*, 19.xii.1972, S. Barker, EA (1 ♂ & 1 ♀), ANIC (1 ♂ & 1 ♀); 2 ♂ & 2 ♀, Fraser Range, W. Aust. on *C. heugeliiana*, 19.xii.1972, S. Barker, BM (1 ♂ & 1 ♀), MNHN (1 ♂ & 1 ♀); 1 ♂, 24 km NE of Lake Grace, W. Aust., on *C. heugeliiana*, 24.i.1973, S. Barker, KC; 1 ♂, Tammin, W. Aust., H. W. Brown, WADA; 1 ♀, 2 km N of Needilup, W. Aust., 23.xii.1972, K. Newby, WADA; 1 ♀, 30 km W of No. 8 pumping station (Kalgoorlie water main) on *Casuarina campestris*, 24.i.1958, WAM, 71-1775; 1 ♀, WAM, 71-1777; 1 ♀, South Tammin Flora Reserve on *C. heugeliiana*, 23.xii.1972, S. Barker, WAM.

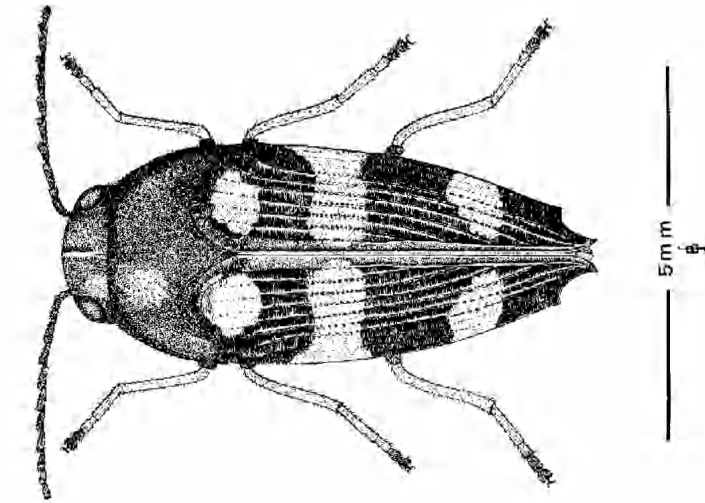


Fig. 8. *Astraeus smythi* sp. nov.

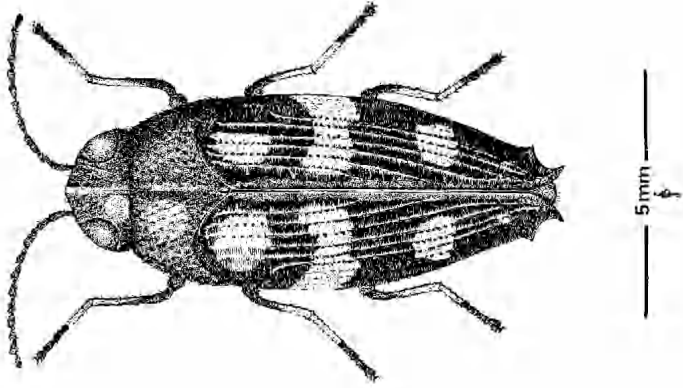


Fig. 9. *Astraeus obscurus* sp. nov.

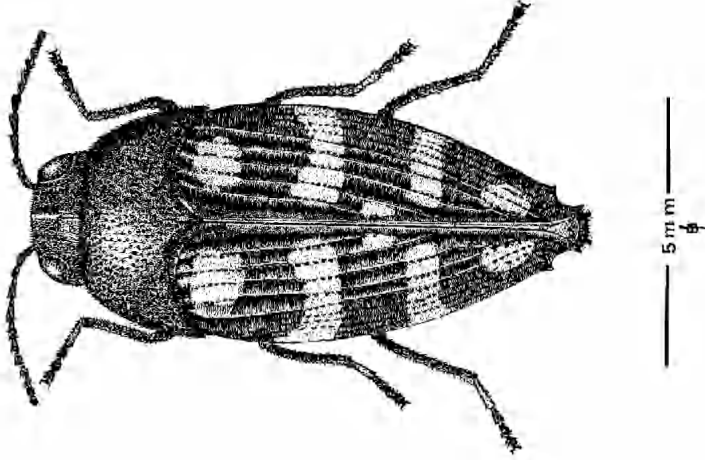


Fig. 10. *Astraeus globosus* sp. nov.

Colour. Shiny. Head purple or black with metallic purple reflections at the apex, metallic blue reflections at the sides and underneath; antennae black with blue and purple reflections, tips of first, second and third segments dark brown. Pronotum purple or black with metallic blue reflections at the sides. Elytra black with blue and purple reflections each with the following yellow markings: a large round basal spot; a broad fascia before the middle concave towards the base commencing at the outer margin, enclosing the humeral fold, running towards the suture but not touching it; a broad fascia after the middle but not touching the outer margin or the suture; a very small preapical spot in the form of a lunette sometimes missing. Undersurface black with purple reflections, except for a red-brown patch on either side of the prosternal process extending to the lateral margin; hairs silver. Legs: femur, basal half of the tibia and second, third and fourth tarsal segments dark brown with blue and purple reflections, apical half of the tibia and first tarsal segment brown.

Shape and sculpture. Head evenly punctured; a large median keel; hairy. Pronotum deeply punctured; a short impressed line projects forward from the basal crypt, becoming a groove and extending to the apex; short with rounded sides gradually narrowing from base to apex; hairy. Elytra costate, the intervals between flat each with a row of shallow punctures; more or less parallel-sided until before the middle then rounded and narrowed to the marginal spine; both spines well developed; humeral fold moderately developed and angled. Undersurface evenly and shallowly punctured; hairy.

Size. Males $9.1 \pm 0.05 \times 3.4 \pm 0.02$ mm (105). Females $9.2 \pm 0.08 \times 3.4 \pm 0.03$ mm (64).

Distribution. Western Australia.

Specimens examined. W. Aust.: Types: 2 ♂ & 2 ♀, Dedari, H. W. Brown, WAM, 71-1771/4; 1 ♂, Spencer's Brook, 26.xii.1946, R. P. McMillan, WAM, 71-1764; 1 ♀, Bejoording, 16.i.1949, WAM, 71-1769; 3 ♂ & 1 ♀, Bejoording, 29.xi.1950, R. P. McMillan, WAM, 71-1765/8; 1 ♂, 11 km E of No. 8 pumping station (Kalgoorlie water main) on *Casuarina campestris*, 20.i.1958, WAM, 71-1776; 33 ♂ & 21 ♀, Coragina rockhole 66 km S of Balladonia on *Casuarina huegeliana*, 5.xii.1974, S. Barker, 21 ♂ & 13 ♀, Ponier rockhole 70 km S of Balladonia on *C. huegeliana*, 5.xii.1974, S. Barker, 14 ♂ & 3 ♀, Juranda rockhole 106 km S of Balladonia on *C. huegeliana*, 9.xii.1974, S. Barker, 3 ♂ & 2 ♀, 115 km S of Balladonia on *Casuarina humilis*, 9.xii.1974, S. Barker.

16. Astraeus (Astraeus) globosus sp. nov.

FIGS 10, 22P

Types.

Holotype: ♂, 77 km along main York Rd, W. Aust. on *Casuarina huegeliana* 5.i.1968, S. Barker, SAM, I 20953.

Allotype: ♀, 77 km along main York Rd, W. Aust. on *C. huegeliana*, 1.i.1968, S. Barker, SAM, I 20954.

Paratypes: 2 ♂ & 1 ♀, Dryandra, W. Aust. on *C. huegeliana* 12.i.1973, S. Barker, EA; 3 ♂ & 2 ♀, Dryandra, W. Aust. on *C. huegeliana*, 8.xii.1970, S. Barker, ANIC (1 ♂ & 1 ♀), MNHN (1 ♂ & 1 ♀), WAM (1 ♂); 1 ♂, 77 km along main York Rd, W. Aust. on *C. huegeliana*, 7.xii.1970, S. Barker, BM; 2 ♂, Toompup, W. Aust. on *Casuarina* sp., 23.i.1972, E. & K. Carnaby, KC; 1 ♀, 77 km along main York Rd, W. Aust. on *Casuarina* sp., 1.i.1968, S. Barker, SAM; 1 ♂, Tutnaming Reserve, W. Aust. on *Casuarina* sp., 1.i.1968, S. Barker, SAM; 1 ♀, Spencer's Brook, W. Aust., 26.xii.1945, R. P. McMillan, WAM, 71-1763.

Colour. Shiny. Head and pronotum and elytra black with coppery reflections; antennae black with coppery and blue reflections. Elytra: each elytron with the following yellow markings: a large spot at the base; a broad fascia before the middle, commencing at the shoulder and ending near the suture but not touching it, concave towards the base; a second fascia after the middle, commencing at the margin but not reaching the suture; an oval preapical spot; a single very small spot between the two fascia and close to the suture. Undersurface metallic coppery; hairs silver. Legs: femur metallic coppery, tibia and tarsi brown with varying amounts of metallic blue on the femora and tibia and on the upper surface of the tarsi.

Shape and sculpture. Head closely punctured; with a median keel; hairy. Pronotum deeply punctured but more closely at the sides than in the middle; short with rounded sides narrowed towards the apex; a short impressed line projects forwards from the basal crypt; hairy. Elytra costate, the intervals flat each with a row of shallow punctures; rounded, diverging slightly from the base to a maximum width before the middle, thereafter rounding off to the marginal spine; both spines well developed; humeral fold moderately developed and angled. Undersurface: finely and sparsely punctured in the middle of the sternal segments, more coarsely and closely punctured at the sides; abdominal sternites finely and closely punctured; hairy.

Size. Males $9.4 \pm 0.13 \times 3.6 \pm 0.05$ mm (21). Females $9.3 \pm 0.3 \times 3.9 \pm 0.15$ mm (7).

Distribution. Western Australia.

General remarks. This species shows closest affinity with *A. obscurus*.

Specimens examined. W. Aust.: Types: 1 ♂, 77 km along main York Rd on *Casuarina* sp., 5.1.1968, S. Barker; 2 ♂, 77 km along main York Rd on *Casuarina huegeliana*, 7.xii.1970, S. Barker; 1 ♂, Dryandra on *C. huegeliana*, 7.xi.1970, S. Barker; 9 ♂ & 1 ♀, Dryandra on *C. huegeliana*, 8.xii.1970, S. Barker.

17. *Astraeus (Astraeus) mastersi* Macleay, 1873: 239. Kerremans, 1885: 136. Masters, 1886: 71. Kerremans, 1892: 102.

Astraeus samouelli: van de Poll, 1886: 176, 1889: 80, 107-109, pl. 3, fig. 18b. Kerremans, 1902: 148. Carter, 1929: 282. Obenberger, 1930: 366.

Astraeus splendens van de Poll, 1889: 86, 108, 109, pl. 3, figs 19, 19a. Kerremans, 1892: 102; 1902: 148. Carter, 1929: 282, pl. 3, fig. 43. Obenberger, 1930: 367 (new synonym).

Astraeus simplex Blackburn, 1892: 211, 212. Kerremans, 1902: 149. Carter, 1929: 282. Obenberger, 1930: 366 (new synonym).

FIGS 1a, 22Q

Type. Holotype: ♀, Gayndah, AM. X32099 (seen by author).

Colour. Male. Shiny. Head and antennae golden-coppery. Pronotum copper coloured in the middle at the apex, with a dark blue heart-shaped area in the middle, outlined by a copper coloured margin; at the sides, blue at the base green at the apex. Elytra black with blue or purple reflections, each elytron with the following yellow markings: a large spot at the base; a broad fascia running from the shoulder covering the humeral fold and running transversely towards the suture but not reaching it; after the middle a broad fascia from the margin running towards the suture but not reaching it; a preapical spot—in some specimens the preapical spot is absent and usually in these the first fascia is broken in the middle forming two spots. Undersurface blue; hairs silver. Legs: blue; the end of the tibia and first tarsal segment testaceous.

Female. Shiny. Head blue-green at the apex, dark at the base and sides with purple reflections; antennae black with blue or purple reflections. Pronotum dark blue in the middle, metallic blue at the sides. Elytra black with purple reflections, each with the following yellow markings: a large spot at the base; a lateral fascia commencing at the margin and covering the humeral fold, running towards the suture but interrupted to form a spot near the

suture; a small spot near the base, at the shoulder, may or may not be continuous with the base of the fascia; after the middle a fascia running transversely from the margin towards the suture but not touching it; a preapical spot. Undersurface blue with metallic gleams; hairs silver. Legs metallic blue; tips of tibia and first tarsal segment testaceous.

Shape and sculpture. Head shallowly, closely but uniformly punctured; with a median keel; hairy. Pronotum shallowly punctured with punctures larger at the sides than in the middle; a median longitudinal excavated line from base to apex; straight sided from the base to the middle then rounded and narrowed to the apex; hairy. Elytra costate, the intervals flat but slightly wrinkled each with a row of punctures; more or less parallel-sided to before the middle, rounded at the middle then tapering to the marginal spine; both spines well developed; humeral fold well developed and acutely angled. Undersurface with shallow uniform punctures except in the middle and on the outer edges of the abdominal sternites, both areas being glabrous; hairy.

Size. Males $7.9 \pm 0.16 \times 2.7 \pm 0.22$ mm (17). Females $8.4 \pm 0.26 \times 3.2 \pm 0.10$ mm (10).

Distribution. Queensland and northern New South Wales.

General remarks. This is the only species of *Astraeus* that has been greatly confused (see van de Poll 1889, p. 79). The basic reason for this is that the females of *A. mastersi* and *A. samouelli* are very similar in pattern although the males of these species are quite distinct. Both species were described from female types. The lack of field collecting experience was the most likely reason for van de Poll redescribing the male of *A. mastersi* as *A. splendens*, as he would not have had access to an associated series of males and females of the two species.

Specimens examined. N.S.W.: Type: 1 ♂ paratype, Ash L. ANIC: 1 ♂ & 1 ♀ paratype, Gayndah. ANIC: Qld: Type: ♂ *A. splendens* van de Poll, Rockhampton; 3 ♀, Dalby, Mrs. F. H. Hobler. SAM: 1 ♀, Stamburpe. A. Gemmell: 14 ♂ & 5 ♀, Edungalba on *Casuarina equisetifolia*, 24.x.1971. E. E. Adams. Type ♀, *A. simplex* Blackburn NM (locality of collection uncertain).

18. *Astraeus (Astraeus) samouelli* Saunders, 1868: 10, pl. 1, fig. 12; 1871: 43. Masters, 1871: 124. Kerremans, 1885: 136. van de Poll, 1886: 176, 178; 1889: 86, 107, pl. 3, figs 18, 18a. Blackburn, 1891: 496. Kerremans, 1892: 102. van de

Poll, 1892: 67, Blackburn, 1892: 212, Kerremans, 1902: 148, Carter, 1929: 282, *Astraeus samouelli*: Gemminger & de Harold, 1869: 1380, Masters, 1886: 71, Blackburn, 1890: 1256, Obenberger, 1930: 366, *Astraeus samouelli*: Kerremans, 1900: 295, *Astraeus splendens* var. *embrikiellus* Obenberger, 1936: 133.

FIGS 1b, 22R

Type. Holotype: ♀ BM (seen by author).

Colour. Male. Shiny. Head golden-green, golden or coppery; antennae coppery or turquoise. Pronotum uniformly golden-green or golden or coppery in the middle then golden-green blending into turquoise at the sides. Elytra black with blue reflections, each with the following yellow markings: a large spot at the base; a fascia just before the middle covering the humeral fold, extending backwards then transversely towards the suture but not touching it; a spot at the shoulder which may be discrete or continuous with the base of the first fascia; a fascia after the middle, commencing at the margin and running towards the suture but not touching it; variably, a small elongate spot between the two fascia closer to the first and near the suture but not touching it; a preapical spot. Undersurface blue-green; hairs silver. Legs blue-green; tips of the tibia and most of the first tarsal segment testaceous.

Female. Shiny. Head green at the apex with golden reflections, dark blue with purple reflections in the middle of the base, turquoise at the sides; antennae green. Pronotum dark blue with purple reflections in the middle, turquoise at the sides. Elytra black with blue reflections, with markings as in the male except that the first fascia is broken in the middle to form a marginal fascia and a spot near the suture. Undersurface turquoise; hairs silver. Legs turquoise; tips of the tibia and most of the basal part of the first tarsal segment testaceous.

Shape and sculpture. Head shallowly, closely but uniformly punctured; with a median keel; hairy. Pronotum shallowly, closely but uniformly punctured; with a median longitudinal excavated line; uniformly rounded and narrowed from base to apex; very hairy. Elytra costate, the intervals between flat; slightly tapered from the base to the middle, then rounded and tapered to the marginal spine; both spines well developed. Undersurface shallowly punctured, more closely at the sides, less so in the middle; midsurface glabrous; hairy.

Size. Males $8.6 \pm 0.07 \times 3.0 \pm 0.03$ mm (52).

Females $9.2 \pm 0.14 \times 3.3 \pm 0.06$ mm (40).

General remarks. The type of *A. splendens* var. *embrikiellus* Obenberger is a ♀ specimen of *A. samouelli*. This species shows closest affinity with *A. mastersi*.

Distribution. New South Wales.

Specimens examined. N.S.W.: Type: 2 ♂ & 3 ♀, Bredbo on *Casuarina stricta*, 8.i.1963, S. Barker; 12 ♂ & 20 ♀, Major's Creek on *Casuarina littoralis*, 26.i.1963, S. Barker; 8 ♂ & 2 ♀, Khanyunis Station, Minuma Range on *C. littoralis*, 9.ii.1963, S. Barker; 4 ♂ & 2 ♀, Captains Flat to Braidwood Rd, on *C. littoralis*, 9.ii.1963, S. Barker; Type ♀ *A. splendens* var. *embrikiellus* Obenberger, Comara, NMP, 21.8.89, A.C.T.: 4♂, Mt Ainslie on *C. stricta*, 26.xii.1962, S. Barker; 7 ♂ & 12 ♀, Tuggeranong on *C. stricta*, 1.xii.1962, S. Barker; 3 ♂ & 8 ♀, Tuggeranong on *C. stricta*, 2.xii.1962, S. Barker; 4 ♂ & 2 ♀, Tuggeranong on *C. stricta*, 1.i.1963, S. Barker.

19. *Astraeus (Astraeus) dilutipes* van de Poll, 1889: 86, 105, 106, pl. 3, fig. 17, 17a, Blackburn, 1892: 212, Kerremans, 1892: 101; 1902: 148, Carter, 1929: 282, Obenberger, 1930: 365.

Astraeus samouelli var. *dilutipes* van de Poll, 1886: 180.

Astraeus strandi Obenberger, 1928: 205; Carter, 1929: 302, Obenberger, 1930: 367 (new synonym).

FIG. 22S

Type. Holotype, MNHN (not seen by author).

Colour. Male. Shiny. Head green at the apex and golden green at the base or golden-green at the apex and coppery at the base; antennae black with blue reflections. Pronotum divided in a transverse direction by an M-shaped line, the small apical part being green or golden-green, the larger basal part being dark blue or black and the line of demarcation, purple or coppery. Elytra black with blue reflections each with the following yellow markings: in the middle but not touching the suture there is: a large basal spot; a spot before the middle; a preapical spot. On the margin: a large spot covering the humeral fold; after the middle a transverse fascia not touching the suture. Undersurface blue or green; hairs silver. Legs: first and second femora brown on the outer margins, third femur totally or partially solid colour similar to the rest of the undersurface; remainder of leg and tarsi testaceous.

Female. Head green at the apex, purple in the middle, dark blue at the base with purple reflections; antennae black with blue reflections. Pronotum black in the centre with purple and blue reflections, blue at the sides. Elytra as in the male. Undersurface dark blue;

hairs silver. Legs: outer margin of femora brown, tibia and tarsi testaceous.

Shape and sculpture. Head very densely and evenly covered with deep punctures; with a thin median keel; covered with long hair. Pronotum evenly punctured, the punctures at the sides larger than those in the middle; slightly rounded but narrowed from base to apex; median excavated line from base to apex; hairy. Elytra costate, the intervals flat with a row of deep punctures and faintly transversely strigose; narrowed from base until after the middle then rounded and again narrowed to the marginal spine; both spines moderately developed; humeral fold well developed and angled. Undersurface evenly and shallowly punctured; with long hairs.

Size. Males $8.9 \pm 0.21 \times 3.1 \pm 0.08$ mm (11). Females $9.4 \pm 0.13 \times 3.4 \pm 0.07$ mm (7).

Distribution. New South Wales and Queensland.

General remarks. The type of *A. strandi* Obenberger is a small ♀ specimen of *A. dilutipes*. The external morphology of this species is like that of *A. mastersi* and *A. samouelli* but male genitalia (Fig. 22S) is different. I do not group it with the other two species.

Specimens examined. N.S.W.: 9 ♂ & 5 ♀, Major's Creek on *Casuarina littoralis*, 26.i.1963, S. Barker. Qld: 2 ♂ & 2 ♀, Paluma on *Casuarina* sp., 13.i.1970, E. E. Adams; Type ♀ *A. strandi* Obenberger, NMP, 21991.

20. *Astracrus (Astracrus) adamsi* sp. nov.

FIGS 11, 22T

Type.

Holotype: ♂, Edungalba, Qld on *Casuarina equisetifolia*, 30.xi.1974, E. & S. Adams, SAM, I 20944.

Allotype: ♀, Edungalba, Qld on *C. equisetifolia*, 15.xii.1973, E. E. Adams, SAM, I 20939.

Paratypes: 3 ♂ & 3 ♀, Edungalba, Qld on *C. equisetifolia*, 15.xii.1974, E. & S. Adams, EA (1 ♂ & 1 ♀), ANIC (1 ♂ & 1 ♀), BM (1 ♀ & 1 ♂); 1 ♂ & 1 ♀, Edungalba, Qld on *C. equisetifolia*, 23.xi.1974 & 8.xii.1974, E. & S. Adams, MNHN; 1 ♂ & 4 ♀, Edungalba, Qld on *C. equisetifolia*, 14.xii.1974, E. & S. Adams, SAM.

Colour. Shiny. Head black with purple reflections or coppery-purple with metallic reflections. Pronotum black with purple reflections or bronze in the middle, coppery purple at the sides with metallic reflections. Elytra black, with blue and purple reflections, each elytron with the following yellow markings: a basal spot; a spot covering the humeral fold but not reaching the shoulder; a large spot in the

middle not touching the suture and just behind the second spot, these last two in the form of a broken fascia; just behind the break, near the margin but not touching it, there is a small spot (not present in a third of the specimens examined); after the middle a fascia concave backwards commencing at the margin but not reaching the suture; a small preapical spot. Undersurface coppery-purple; legs pale brown, the basal ends of the tibia darker; hairs silver.

Shape and sculpture. Head closely and evenly punctured; no median keel; lightly haired. Pronotum closely and evenly punctured except for a short glabrous line in the middle at the apex; at the sides gradually rounded and narrowed from base to apex. Elytra costate, each interval with a row of deep punctures and faintly transversely wrinkled; parallel-sided to just before the middle then rounded and tapered to the sharp marginal spine; sutural spine well developed; humeral fold well developed and angled. Undersurface closely and evenly punctured, the punctures shallower on the prosternal process than elsewhere; lightly haired.

Size. Males $7.1 \pm 0.14 \times 2.9 \pm 0.05$ mm (6). Females $7.7 \pm 0.10 \times 3.2 \pm 0.04$ mm (9).

Distribution. Queensland.

General remarks. Male genitalia (Fig. 22T) of *A. adamsi* is similar to that of *A. dilutipes* but external morphology is different. I do not group these two species. Named after Mr E. E. Adams.

Specimens examined. Types only.

21. *Astracrus (Astracrus) intricatus* Carter, 1925: 229, fig. 1; 1929: 282. Obenberger, 1930: 366.

FIGS 1c, 12, 23A

Type. Holotype: ♂, Monaro, MM (seen by author).

Colour. Shiny. Head metallic green at the apex and sides, purple at the base; antennae black with coppery-purple reflections. Pronotum metallic purple in the middle, deep coppery-purple at the sides. Elytra black with purple reflections, each elytron with the following yellow markings: a basal spot, a spot at the middle and a spot after the middle, all elongate and decreasing in size from in front backwards, each with the basal end diverging outwards and all in line to give the appearance of a single, broken vitta with the basal end diverging outwards and the apical end converging to the suture, but not touching it; a fascia commencing at the shoulder, covering

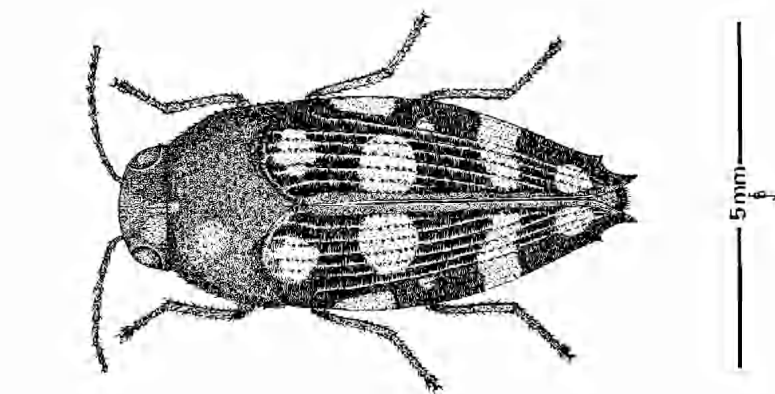


Fig. 11. *Astraeus adamsi* sp. nov.

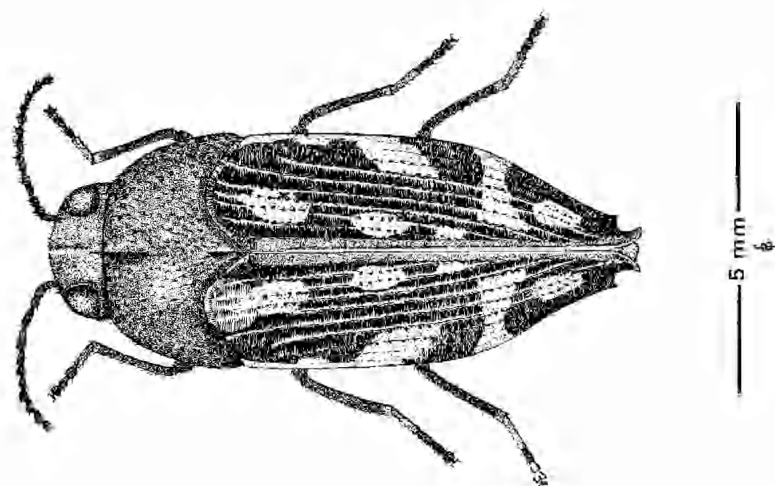


Fig. 12. *Astraeus intricatus* Carter

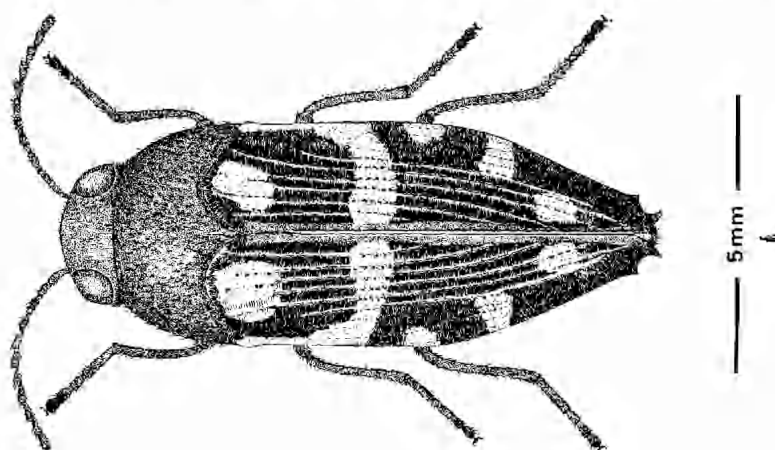


Fig. 13. *Astraeus macmillani* sp. nov.

the humeral fold and running along the outer margin to the middle then extending obliquely towards the suture, reaching slightly below but not touching the middle of the three median spots; after the middle a fascia commencing at the outer margin and running transversely towards the suture but not touching it; an elongate preapical spot, close to the suture but not touching it. Undersurface deep coppery-purple; hairs silver. Legs deep coppery-purple, ends of the tibia, first and second tarsal segments brown, third and fourth tarsal segments dark brown.

Shape and sculpture. Head closely punctured; with a median keel; hairy. Pronotum more closely punctured at the sides than in the middle, with a median longitudinal impressed line visible at the base and apex only; parallel-sided at the base, gently rounded until after the middle, strongly rounded and narrowed to the apex, projecting forward slightly in the middle of the apical edge; hairy. Elytra costate, the intervals between flat, each with a row of shallow punctures; parallel-sided from the base, rounded off well after the middle and narrowed strongly to the marginal spine; both spines well developed; humeral fold moderately developed and angled. Undersurface: sternal segments finely and sparsely punctate in the middle, deeper and larger punctures at the sides; abdominal sternites finely and closely punctured; hairy.

Size. Males $9.6 \pm 0.10 \times 3.5 \pm 0.05$ mm (50). Females $9.8 \pm 0.15 \times 3.6 \pm 0.07$ mm (35).

Distribution. New South Wales.

General remarks. The species was described by Carter from a unique specimen in the MacLeay Museum. Only two of the 85 specimens I have collected conform to the colour pattern of the type. The pattern on the elytra is variable, ranging from the basic pattern as described herein (nine specimens) to patterns in which all of the yellow markings are confluent, giving the appearance of yellow elytra with black borders. Between the extremes, intermediary patterns occur, including the intricate pattern of Carter's type. There is no difference between the sexes in size or colour pattern. All of the specimens I collected were taken on low *Castuarina nana* heath in the Minura and Kybean Ranges, Monaro District, N.S.W. I do not group *A. intricatus* with any other species.

Specimens examined. N.S.W.: Type; 5 ♂ & 10 ♀, Oranmeir on *Castuarina nana*, 9.xii.1962, S. Bar-

ker; 23 ♂ & 9 ♀, Oranmeir on *C. nana*, 26.i.1963, S. Barker; 3 ♂, 16 km S of Countegany Station on *C. nana*, 3.ii.1963, S. Barker; 20 ♂ & 15 ♀, Khanyunis Station on *C. nana*, 9.ii.1963, S. Barker.

22. *Astracis (Astracis) crassus* van de Poll, 1889: 85, 95-97, pl. 2, fig. 9, 9a. Kerremans, 1892: 101; 1902: 148. Carter, 1929: 282. Obenberger, 1930: 365.

Astracis flavopictus van de Poll, 1886: 180.

FIG. 23B

Type. Holotype, MNHN (not seen by author).

Colour. Shiny. Head and pronotum black with purple or blue and purple reflections; antennae black with blue and purple reflections. Elytra black with blue and purple reflections each with the following yellow markings: the basic pattern consists of irregular spots in two rows; four spots in the middle near the suture, but not touching it, one at the base, one before the middle, one after the middle and one in the preapical area; three spots along the margin, one at the shoulder and covering the humeral fold, one at the middle and one after the middle; there may also be a few irregular spots and in two specimens there are spots at the base of the sutural spine. Undersurface and legs black with blue and purple reflections; hairs silver.

Shape and sculpture. Head with a median keel; evenly punctured; hairy. Pronotum with small and sparse punctures in the middle leaving glabrous areas, larger and more dense at the sides with a short impressed line projecting forwards from the basal crypt; gently rounded and narrowed at the sides from the base to two-thirds way to the apex, then tapered to the apex with the apical edge projecting slightly in the middle. Elytra punctate-striate with the intervals flat towards the base and slightly concave towards the apex, each with a row of shallow punctures; parallel-sided until after the middle, then gently rounded and narrowed to the small marginal spine; sutural spine well developed; humeral fold poorly developed but slightly angled. Undersurface shallowly punctured, more closely at the sides than in the middle; hairy.

Size. Males $14.4 \pm 0.25 \times 5.3 \pm 0.06$ mm (5). Females $16.2 \pm 0.40 \times 6.3 \pm 0.15$ mm (7).

Distribution. Queensland and New South Wales.

General remarks. This species cannot be grouped with any other.

Specimens examined. Qld: 1 ♂, E. Sutton, N.S.W.: 1 ♂ & 1 ♀, Sydney, SAM; 1 ♀, Griffith, SAM; 1 ♀, Jenolan Caves, J. C. Wilburd, SAM; 1 ♀, J. G. Tepper, SAM; 1 ♀, Sydney, W. du Boulay, SAM; 1 ♀, W. du Boulay, SAM; 1 ♀, SAM; 2 ♂, Majors Creek on *Casuarina littoralis*, 26.1.1963, S. Barker, 1 ♂, Khanyinis Station, Minuma on *C. littoralis*, 26.1.1963, S. Barker.

23. *Astraeus (Astraeus) major* Blackburn, 1890: 1257, 1258; 1891: 496. Kerremans, 1892: 102; 1902: 149.

Astraeus navarchis var. *major*: Carter, 1929: 282. Obenberger, 1930: 366.

FIGS 17, 23C

Type. Holotype, BM (not seen by author).

Colour. Shiny. Head coppery with metallic reflections; antennae coppery-green or blue. Pronotum dark blue with purple reflections. Elytra dark blue with blue and purple reflections, each elytron with the following yellow markings: a fascia running from the shoulder transversely across the base towards the suture but not touching it; before the middle a thick fascia running from the margin transversely to the suture; after the middle there is a fascia commencing at the margin, running towards the suture but not reaching it. There is an oval red spot in the region of the marginal spine. The outer margins of the fascia and humeral fold are red. Undersurface dark blue with metallic purple reflections; hairs yellow. Legs red-brown; tarsi blue.

Shape and sculpture. Head with sparse shallow punctures at the base, wrinkled towards the apex; with a thin median keel; hairy. Pronotum with small shallow punctures in the middle, larger deeper ones at the sides with an irregular glabrous longitudinal area in the middle; there is a short median longitudinal impressed line projecting forwards from the basal crypt; short with the sides gradually rounded from base to apex. Elytra punctate-striate from the base for most of the length, the intervals between the striae convex, costate at the apex only; parallel-sided until just after the middle then gradually rounded to the marginal spine; both spines well developed; humeral fold poorly developed and slightly angled. Undersurface densely punctured at the sides, sparsely and shallowly punctured in the middle; hairy.

Size. Males $15.3 \pm 0.70 \times 5.9 \pm 0.22$ mm (4). Females $15.5 \pm 0.98 \times 6.3 \pm 0.91$ mm (2).

Distribution. Western Australia, South Australia and Victoria.

General remarks. I have no evidence of overlap in the distribution of this species, which

is found in low rainfall areas of three states, and *Astraeus navarchis*, which is presumably found in higher rainfall areas in Victoria. Because of differences in distribution and appearance I have treated the two as distinct species.

Specimens examined. W. Aust.: 1 ♂, WAM, 73-62; 1 ♂, Jung, SAM; 1 ♂, Wiadki on *Acacia coolgardiensis*, 18.ix.1957, S. Barker, WAM, 73-60; 1 ♂, Culham, 6.ix.1961, R. P. McMillan, WAM, 73-61. S. Aust.: 1 ♀, Monarto, J. G. O. Tepper, SAM. Vic.: 1 ♀, Sea Lake, Goudie, NM.

24. *Astraeus (Astraeus) navarchis* (Thomson)

Conognatha navarchis Thomson, 1856: 115, 116, pl. 6, fig. 2. Masters, 1886: 79. *Astraeus navarchis*: Saunders, 1871: 43. van de Poll, 1886: 176. Masters, 1886: 71. van de Poll, 1889: 84, 91, 92, pl. 2, fig. 5, 5a. Blackburn, 1890: 1257. Kerremans, 1892: 102. Blackburn, 1892: 211. Kerremans, 1902: 148. Carter, 1929: 282. Obenberger, 1930: 366.

FIG. 23D

Type. Holotype, MNHN (not seen by author).

Colour. Shiny. Head coppery at the apex, dark blue and purple at the base; antennae dark brown, segments one and two with golden-green reflections, the rest with blue and purple reflections. Pronotum coppery at the apex and sides, dark blue and violet at the base. Elytra black with violet reflections; each elytron with two yellow fascia, the first commencing at the margin and covering the humeral fold, slightly concave towards the base and touching the suture, the second after the middle, commencing at the margin and running transversely towards the suture but not touching it. Undersurface: prothoracic sternites metallic golden-green, abdomen metallic violet; hairs yellow. Legs red-brown with violet reflections.

Shape and sculpture. Head closely punctured at the base, grooved and wrinkled at the apex; slightly excavated between the eyes towards the base, but with a thin glabrous median keel commencing anterior to this; hairy. Pronotum with small punctures in the middle, but mainly lacking in the centre, forming an indefinite median longitudinal glabrous line, the punctures larger and deeper at the sides; a median longitudinal impressed line projects forwards from the basal crypt to the middle; short, rounded at the sides and narrowed from base to apex. Elytra punctate-striate, the intervals convex at the base, flat at the apex, those in the centre with a shallow row of punctures, those at the sides with deep punctures;

parallel-sided until after the middle, then rounded and narrowed to the marginal spine; both spines well developed; humeral fold poorly developed and slightly angled. Undersurface: anteriorly the punctures are small in the middle and larger at the sides, on the abdomen uniformly small; hairy.

Size. Males $14.4 \pm 0.41 \times 5.5 \pm 0.13$ mm (7). Females $16.2 \pm 0.34 \times 6.6 \pm 0.08$ mm (5).

Distribution. Victoria.

General remarks. This species shows close affinity with *A. major*.

Specimens examined. Vic.: 2 ♂, SAM; 1 ♀, Jan Jac, NM; 5 ♂ & 4 ♀, NM.

25. *Astraeus (Astraeus) fraterculus* van de Poll, 1889: 84, 92, 93, pl. 2, figs 6, 6a. Kerremans, 1892: 102; 1902: 149. Carter, 1929: 282. Ohenberger, 1930: 365.

FIG. 23E

Type. Holotype MNHN (not seen by author).

Colour. Shiny. Head antennae and pronotum blue-black with blue reflections. Elytra blue-black, each elytron with two yellow fasciae; the first commencing at the shoulder and covering the humeral fold, then running transversely towards the suture but not touching it, concave towards the base; the second after the middle, commencing at the margin and running transversely towards the suture but not touching it. Undersurface deep metallic blue; hairs silver. Legs deep metallic blue.

Shape and sculpture. Head shallowly and sparsely punctured; with a small median keel; hairy. Pronotum sparsely but evenly punctured, the punctures at the sides larger and deeper than those in the middle; a short median longitudinal impressed line projects forwards from the basal crypt; short, the sides tapering acutely from base to apex, slightly rounded in the middle. Elytra costate, the intervals flat with irregular shallow punctures; parallel-sided until after the middle, then rounded and narrowed to the marginal spine; both spines well developed; humeral fold poorly developed and slightly angled. Undersurface with small shallow punctures in the middle, larger and deeper punctures at the sides; hairy.

Size. Males $9.3 \pm 0.30 \times 4.2 \pm 0.10$ mm (7). Females $8.8 \pm 0.30 \times 4.0 \pm 0.11$ mm (3).

Distribution. Western Australia.

General remarks. The external morphology of this species is very similar to that of *A. major*

and *A. navarchis*, however male genitalia is different (Fig. 23E). Therefore I do not group the three species together but place *A. fraterculus* next to *A. major* and *A. navarchis*.

Specimens examined. W. Aust.: 3 ♂ & 1 ♀, Borden on *Hakea trifurcata*, November 1939, H. W. Brown, WAM, 73-378/381; 1 ♀, Bushmead, 18.xi.1939, R. P. McMillan, WAM, 73-383; 2 ♂ & 1 ♀, Hopetoun, 18.x.1946, Mrs. Morris, WAM, 96-1910/1912; 1 ♂, Wembly on *Daviesia divaricata*, 5.ix.1970, S. Barker; 1 ♂, Borden, WAM, 73-382.

26. *Astraeus (Astraeus) prothoracicus* van de Poll, 1889: 85, 98, 99, pl. 3, fig. 11, 11a. Kerremans, 1892: 102; 1902: 149. Carter, 1929: 282. Ohenberger, 1930: 366.

FIG. 23F

Type. Holotype, MNHN (not seen by author).

Colour. Shiny. Head, antennae and pronotum bronze. Elytra dark brown with bronze reflections, each with the following yellow markings: along the margin there is a vitta, commencing at the shoulder and ending in the preapical area which may be broken into several elongate spots; in the middle but not touching the suture there is a vitta commencing on the anterior edge and ending in the preapical area, this is usually broken into a basal spot, a spot before the middle and an elongate spot after the middle. Undersurface bronze; hairs silver. Legs red-brown.

Shape and sculpture. Head closely and evenly punctured; no median keel; hairy. Pronotum with punctures wrinkled at the front and sides, projecting conically in the middle where the punctures coalesce and become strigose; gently rounded at the sides from the base to the middle, then tapered and narrowed to the apex, the apical edge broadly convex in the middle; hairy. Elytra costate, the intervals flat with a deep row of punctures; parallel-sided until after the middle then very gently rounded to the marginal spine; both spines poorly developed, blunt and close together; humeral fold poorly developed and slightly angled. Undersurface: punctures closer at the sides than in the middle; legs and whole undersurface densely covered with hair.

Size. Males $10.4 \pm 0.33 \times 3.7 \pm 0.13$ mm (3). Females $10.5 \pm 0.25 \times 3.9 \pm 0.17$ mm (6).

Distribution. Western Australia and Queensland.

General remarks. van de Poll (1889) listed the two specimens he had as coming from Clarence River and Champion Bay, and Car-

ter (1929) gave the range as Clarence River, N.S.W. It is now known that in Western Australia the species is associated with *Banksia prionotes* which occurs on yellow sandplain in a wide area between Shark Bay and Esperance, van de Poll's reference to Champion Bay would be to the Geraldton area. I have not located a specimen from N.S.W. Overall the body shape of this species is elongate and more or less cylindrical.

Specimens examined. Qld: 1 ♀, Myall Park, Glenmorgan, Nov. 1962, Dorothy Gordon, JH. W. Aust.: 2 ♂ & 1 ♀, Tammin, 21.xi.1939, A. M. Douglas, WAM, 39-2668/70; 1 ♂ & 3 ♀, Goomalling, 14.i.1950, R. P. McMillan, WAM, 73-371/374; 1 ♀, 19 km N of Northampton, 1.i.1972, K. T. Richards, WADA.

27. *Astraeus (Astraeus) elongatus* van de Poll, 1886: 177; 1889: 85, 101, 102, pl. 3, fig. 14, 14a, Kerremans, 1892: 101; 1902: 148, Carter, 1929: 282, Ohenberger, 1930: 365.

FIG. 23G

Type. Holotype, MNHN (not seen by author).

Colour. Shiny. *Male.* Head and pronotum green; antennae blue-green. Elytra black with purple-blue reflections with the following yellow markings: a single spot at the base; a spot at the shoulder covering the humeral fold; a spot on the outer margin at the middle; a spot between the previously described one and the apex; near the suture but not touching it there is a large spot before the middle, a smaller one after the middle and a smaller pre-apical spot. Undersurface and legs green; hairs silver.

Female. Head and pronotum golden-green with golden reflections; antennae blue-green. Elytra as in the male. Undersurface and legs golden-green; hairs silver.

Shape and sculpture. Head deeply and evenly punctured; no median keel; hairy. Pronotum with punctures closer at the sides than in the middle; with a short median longitudinal impressed line projecting forwards from the basal crypt; laterally dilated and with the apical edge projecting in the middle; hairy. Elytra punctate-striate at the base costate towards the apex, the intervals flat and slightly transversely wrinkled; more or less parallel-sided, rounded after the middle to the marginal spine; both spines well developed; humeral fold poorly developed, slightly angled. Undersurface closely punctured; hairy.

Size. Males $10.5 \pm 0.4 \times 3.7 \pm 0.13$ mm (8).

Females $11.8 \pm 0.28 \times 4.2 \pm 0.11$ mm (12).

Distribution. Western Australia.

General remarks. A single specimen collected at Dryandra has a bright blue head and prothorax. Overall the body shape is elongate and cylindrical. This species has closest affinity with *A. prothoracicus*.

Specimens examined. W. Aust.: 7 ♂ & 9 ♀, Quairading on *Xanthorrhoea* sp., 19.x.1970, S. Barker; 1 ♂ & 2 ♀, Quairading on *Xanthorrhoea*, 7.xi.1970, S. Barker; 1 ♀, Dryandra on *Casuarina hugellana*, 8.xii.1970, S. Barker.

28. *Astraeus (Astraeus) vittatus* van de Poll, 1889: 85, 99, 100, pl. 3, fig. 12, 12a. Kerremans, 1892: 102, Carter, 1929: 282, Ohenberger, 1930: 367.

Astraeus vittatus: Kerremans, 1902: 149.

FIG. 23H

Type. Holotype, MNHN (not seen by author).

Colour. Shiny. Head and pronotum black with purple reflections; antennae black with blue reflections, the apex on the first, second and third segments dark brown with purple reflections. Elytra black with violet reflections, each with the following yellow markings: a vitta along the margin from the shoulder to the preapical region, broken just after the middle; a vitta in the middle but not touching the suture from the base to near the apex, broken near the middle. Undersurface metallic purple; hairs silver. Legs brown.

Shape and sculpture. Head broad and closely punctured; no median keel; hairy. Pronotum with small and shallow punctures in the middle, larger and deeper at the sides; gradually rounded from base to apex; the anterior margin projecting forwards in the middle, hairy. Elytra punctate-striate at the base, faintly costate at the apex and slightly wrinkled, the intervals slightly convex at the base and flat at the apex, each with a row of punctures; parallel-sided until just after the middle, then tapered to the very short marginal spine, sutural spine very broad; humeral fold poorly developed, slightly angled. Undersurface closely and densely covered with fine punctures; hairy.

Size. Male 9.9×3.7 mm (1).

Distribution. Western Australia.

Specimens examined. W. Aust.: 1 ♂, Watning, 10.xii.1950, R. P. McMillan, WAM, 71-1761.

29. *Astraeus (Astraeus) flavopictus* LaPorte & Gory, 1837: 2, pl. 1, fig. 1. Imhoff, 1856: 46, Lacordaire, 1857: 43, Gemminger & de Harold, 1869: 1380, Masters, 1871:

124. Saunders, 1871: 43. Kerremans, 1885: 136. van de Poll, 1886: 176, 177. Masters, 1886: 71. van de Poll, 1889: 85, 97, 98, pl. 2, fig. 10, 10a. Kerremans, 1892: 101; 1902: 148. Carter, 1929: 282. Obenberger, 1930: 365. Barker, 1964: 306, 307.

FIG. 231

Type. Holotype, MNHN (not seen by author).

Colour. Shiny. Head and pronotum brown with variable green and/or purple reflections; antennae black with blue reflections. Elytra brown with variable bronze and violet reflections, with the following yellow markings in two rows, one in the middle but not touching the suture, the other along the margin; in the middle; an elongate basal spot; a transverse bar before the middle; an elongate spot after the middle; a long thin preapical mark. Along the margin: an elongate spot from the shoulder covering the humeral fold; a spot in the middle; a spot after the middle. The three spots along the margin may coalesce forming a single vitta or be separated into two or three spots. Undersurface and legs bronze; hairs silver.

Shape and sculpture. Head densely punctured; no median keel; hairy. Pronotum closely and evenly punctured; basal half parallel-sided, thereafter rounded to the apex; apical edge projecting forward in the middle; a short impressed line projects forwards from the basal crypt; hairy. Elytra costate, the intervals flat but deeply punctured and slightly wrinkled; parallel-sided from base until after the middle, then narrowed to the small marginal spine; sutural spine short; humeral fold moderately developed and angled. Undersurface closely and evenly punctured; densely hairy as are the legs.

Size. Males $10.9 \pm 0.38 \times 3.9 \pm 0.17$ mm (12). Females $12.0 \pm 0.27 \times 4.4 \pm 0.10$ mm (15).

Distribution. Western Australia.

General remarks. This species shows closest affinity with *A. vittatus*.

Specimens examined. W. Aust.: 1 ♀, Porongroup, 28.ii.1963, F. H. Uther Baker; 1 ♂ & 1 ♀, 64 km along main York Rd, on *Jacksonia* sp., 1.i.1968, S. Barker; 11 ♂ & 13 ♀, 64 km along main York Rd, on *Jacksonia* sp., 6.xi.1970, S. Barker.

30. *Astraeus (Astraeus) macmillani* sp. nov.

FIGS 13, 231

Types.

Holotype: ♂, 77 km along main York Rd, W. Aust. on *Casuarina huegeliana*, 21.x.1970, S. Barker, SAM, I 20955.

Allotype: ♀, 77 km along main York Rd, W. Aust. on *C. huegeliana*, 5.i.1968, S. Barker, SAM, I 20956.

Paratypes: 1 ♂ & 1 ♀, 77 km along main York Rd, W. Aust. on *Casuarina* sp., 1.i.1968, S. Barker, EA; 2 ♂ & 2 ♀, 77 km along main York Rd, W. Aust. on *C. huegeliana*, 21.xi.1970, S. Barker, ANIC (1 ♂ & 1 ♀), BM (1 ♂), MNHN (1 ♀); 1 ♀, 77 km along main York Rd, W. Aust. on *C. huegeliana*, 5.i.1968, S. Barker, BM; 6 ♂ & 2 ♀, 77 km along main York Rd, W. Aust. on *C. huegeliana*, 7.xi.1970, S. Barker, MNHN (1 ♂), SAM (4 ♂ & 2 ♀), WAM (1 ♂); 1 ♂ & 2 ♀, 11 km S of Walebing, W. Aust., 6.x.1971, K. T. Richards, WADA; 1 ♀, 77 km along main York Rd, W. Aust. on *C. huegeliana*, 5.i.1968, S. Barker, WAM.

Colour. Shiny. Head black with purple reflections; antennae black with metallic blue reflections, each of segments 1-4 with dark brown apex. Pronotum black with blue-green reflections in the middle, purple reflections in the front and at the sides. Elytra black with purple reflections, each with the following yellow markings: a large spot at the base; a fascia commencing at the shoulder, covering the humeral fold and running transversely towards the suture but not touching it, concave towards the base (sometimes broken into a marginal and a medial spot); a small spot after the middle on the outer margin; an oval preapical spot; between the last two spots a short fascia, running from the margin, half way to the suture. Undersurface metallic purple and bronze; hairs silver. Legs red-brown.

Shape and sculpture. Head closely punctured; no median keel; hairy. Pronotum deeply and closely punctured at the sides, sparsely in the middle; a median longitudinal impressed line projects forwards from the basal crypt to the middle; parallel-sided at the base then rounded and narrowed to the apex. Elytra costate, the intervals flat each with a shallow row of punctures; more or less parallel-sided until the middle then rounded and tapered to the marginal spine; both spines well developed; humeral fold moderately developed and angled. Undersurface: thoracic sternites finely and sparsely punctured in the middle more closely at the sides; abdominal segments finely and closely punctured; hairy.

Size. Males $10.5 \pm 0.10 \times 3.9 \pm 0.04$ mm (47). Females $11.7 \pm 0.15 \times 4.3 \pm 0.06$ mm (36).

Distribution. Western Australia.

General remarks. In some species the marginal spot is reduced or lost, in others there is an additional spot close to the suture and between the two fascia. Named after Mr R. P. McMillan.

Specimens examined. W. Aust.: Types: 5 ♂ & 4 ♀, 77 km along main York Rd on *Casuarina* sp., 5.i.1968, S. Barker; 11 ♂, *Dryandra* on *Casuarina* sp., 21.x.1970, S. Barker; 6 ♂ & 6 ♀, *Dryandra* on *Casuarina huegeliana*, 11.xi.1970, S. Barker; 2 ♂ & 2 ♀, 6 km E of North Bannister on *C. huegeliana*, 19.xi.1970, S. Barker; 6 ♂ & 4 ♀, 77 km along main York Rd on *C. huegeliana*, 21.xi.1970, S. Barker; 1 ♂ & 3 ♀, 77 km along main York Rd on *C. huegeliana*, 7.xii.1970, S. Barker; 5 ♂ & 7 ♀, *Dryandra* on *C. huegeliana*, 8.xii.1970, S. Barker; 1 ♂, *Dryandra* on *C. huegeliana*, 12.i.1973, S. Barker.

31. *Astraeus (Astraeus) carnabyi* sp. nov.

FIGS 1d, 14, 23K

Types.

Holotype: ♂, 16 km NE of Lake Grace, W. Aust., on *Casuarina huegeliana*, 9.i.1972, E. & K. Carnaby, SAM, 1 20947.

Allotype: ♀, 16 km NE of Lake Grace, W. Aust., on *C. huegeliana*, 3.i.1971, E. & K. Carnaby, SAM, 1 20948.

Paratypes: 1 ♂ & 1 ♀, 16 km NE of Lake Grace, W. Aust. on *C. huegeliana*, 9.i.1972, E. & K. Carnaby, ANIC; 1 ♀, 16 km NE of Lake Grace, W. Aust. on *C. huegeliana*, 25.i.1973, E. & K. Carnaby, BM; 1 ♂ & 1 ♀, 16 km NE of Lake Grace, W. Aust. on *C. huegeliana*, E. & K. Carnaby, KC; 1 ♂ & 1 ♀, 16 km NE of Lake Grace, W. Aust. on *C. huegeliana*, 25.i.1972, E. & K. Carnaby, MNHN (1 ♂), WAM (1 ♀); 1 ♀, 24 km S of Lake King, W. Aust. on *C. huegeliana*, 25.i.1973, S. Barker, MNHN; 4 ♂ & 1 ♀, 14 km N of Needilup, W. Aust. on *C. huegeliana*, 14.xii.1972, K. T. Richards, WADA.

Colour. Shiny. Head, pronotum and elytra black with purple reflections; antennae black with blue and purple reflections. Each elytron with the following yellow markings: an elongate spot at the base reaching the anterior margin; a fascia commencing at the anterior lateral margin, covering the humeral fold then running upwards towards the suture but not touching it, concave forwards; a small fascia just after the middle, commencing at the margin and at right angles to the suture but reaching only half way to it; midway between the two fascia are two small spots, one on the margin and the other near the suture but not touching it; a small preapical spot. Undersurface metallic purple; hairs silver. Legs dark, upper sides with metallic blue reflections, undersides metallic purple.

Shape and sculpture. Head with medium sized punctures on basal half merging into irregular

longitudinal channels on apical part; no median keel; hairy. Pronotum evenly punctured, with a median glabrous line at the base and apex; sides rounded gradually from base to apex; hairy. Elytra costate, the intervals between flat, each with a row of shallow punctures; parallel-sided until just after the middle, then rounded off to the strong marginal spine; well developed sutural spine; humeral fold poorly developed but slightly angled. Undersurface evenly and shallowly punctured; hairy. *Size.* Males $9.8 \pm 0.17 \times 3.7 \pm 0.06$ mm (8). Females $10.6 \pm 0.23 \times 4.0 \pm 0.11$ mm (7).

Distribution. Western Australia.

General remarks. Named after Mr K. Carnaby.

Specimens examined. Types only.

32. *Astraeus (Astraeus) badeni* van de Poll, 1889: 84, 93, 94, pl. 2, fig. 7, 7a. Blackburn, 1891: 496. Kerremans, 1892: 101. van de Poll, 1892: 67. Blackburn, 1895: 45, 46. Kerremans, 1902: 148. Carter, 1929: 282. Obenberger, 1930: 365.

Astraeus badeni var. *disjunctus* Obenberger, 1928: 204; 1930: 365.

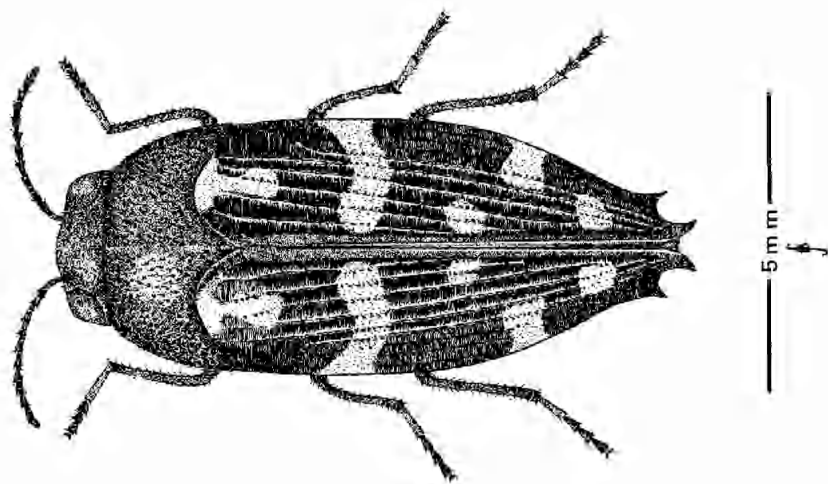
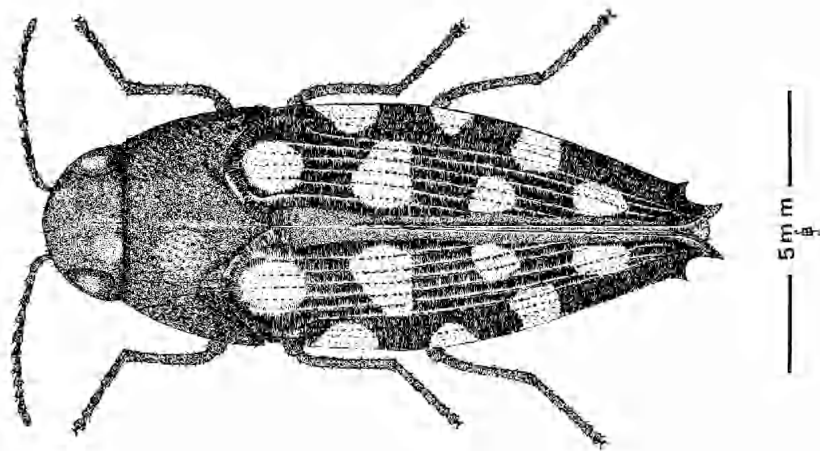
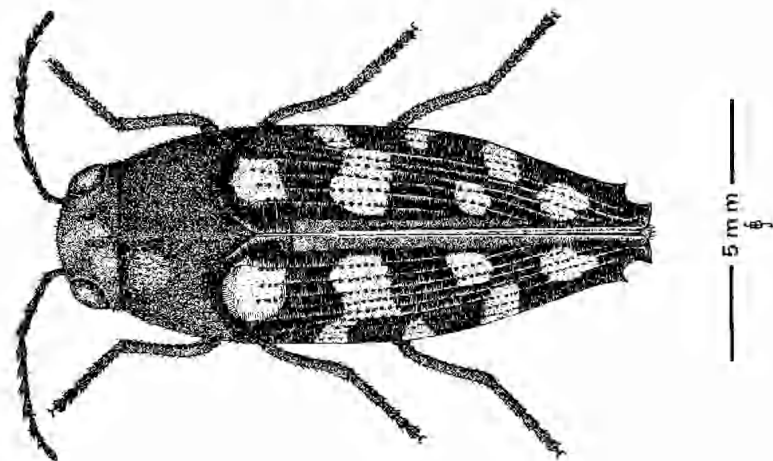
Astraeus meyricki Blackburn, 1890: 1256, 1257. Kerremans, 1892: 102. Blackburn, 1895: 45, 46.

FIG. 23L

Type. *Holotype:* ♀ MNHN (seen by author).

Colour. Shiny. Head, pronotum and elytra black with blue reflections; antennae black with blue reflections, tips of first and second segments brown. Elytra: each elytron with the following yellow markings: a spot at the base; a fascia commencing at the margin on the humeral fold, running obliquely upwards and backwards and then at right angles to the longitudinal axis of the body, just before the middle and not touching the suture (this is frequently broken to form two spots *vide* var. *disjunctus* Obenberger, but this has no taxonomic significance); just after the middle there is a small fascia commencing at the margin, slightly concave to the apex and not touching the suture. Undersurface and legs dark with metallic purple reflections; hairs silver.

Shape and sculpture. Head evenly punctured; no median keel; hairy. Pronotum with shallow punctures larger at the sides than in the middle; at the sides gradually rounded and narrowed from base to apex; hairy. Elytra costate, the intervals between flat each with a row of shallow punctures; parallel-sided until after the middle then rounded off to the marginal spine; strong sutural spine; humeral fold

Fig. 14. *Astraeus carnabyi* sp. nov.Fig. 15. *Astraeus carteri* sp. nov.Fig. 16. *Astraeus goerlingi* sp. nov.

poorly developed but slightly angled. Undersurface, punctures sparser in the middle than at the sides; hairy.

Size, Males $8.8 \pm 0.14 \times 3.4 \pm 0.07$ mm (16). Females $8.9 \pm 0.16 \times 3.5 \pm 0.07$ mm (17).

Distribution. All of mainland Australia except the Northern Territory.

General remarks. This species was described almost simultaneously by van de Poll as *A. badeni* and by Blackburn as *A. meyricki*. Blackburn (1891) recognised *A. meyricki* as a synonym of *A. badeni*, but later changed his mind and called *A. meyricki* a good species (Blackburn 1895). Distance between the two populations was the main argument used by Blackburn (1895) in favour of calling the eastern and western representatives two distinct species. I have been unable to separate specimens collected in Western Australia from those collected in South Australia.

Specimens examined. *S. Aust.*: Type; 1 ♂ & 1 ♀, Morgan, A. M. Lea, SAM; 1 ♀, Murray Bridge, Oct. 1911, SAM; 8 ♂ & 6 ♀, on *Melaleuca* sp., Derna Pass (probably the same as Puttapa Gap), 21 km S of Copley, 25.x.1969, N. McFarland, SAM; 7 ♂ & 9 ♀, Puttapa Gap, Flinders Ranges on *Melaleuca glomerata*, 21.x.1971, S. Barker, W. Aust.: Paratype of *A. meyricki* Blackburn, SAM; 1 ♀, 18 km SW of Three Springs on *Dryandra cirsoides*, 8.xi.1968, N. McFarland, SAM; 3 ♂ & 3 ♀, Juranda rockhole, 106 km S of Balladonia on *Callitris preissii*, 9.xii.1974, S. Barker, N.S.W.: 1 ♀, W. du Boulay, WAM, 73-54. *Qld.*: Type ♀ *A. badeni* var. *disjunctus* Obenberger, NMP, 21 990.

33. *Astraeus (Astraeus) jansoni* van de Poll, 1889: 84, 94, 95, pl. 2, fig. 8, 8a; Blackburn, 1891: 496, Kerremans, 1892: 102, van de Poll, 1892: 68, Blackburn, 1894: 101; 1895: 46, Kerremans, 1902: 148, Carter, 1929: 282, Obenberger, 1930: 366, Carter, 1933: 42.

Astraeus tepperi Blackburn, 1890: 1258, 1259.

FIG. 23M

Type. Holotype, MNHN (not seen by author).

Colour. Shiny. Head, pronotum and elytra bronze-green or black with green or purple reflections; antennae black with blue or purple reflections. Elytra: each elytron with the following yellow markings; along the margin, a spot at the shoulder half covering the humeral fold, a spot before the middle, a fascia after the middle running transversely towards the suture but not touching it; in the middle near the suture but not touching it, a spot at the base, a spot before the middle, a spot at the

middle, a preapical spot. Undersurface and legs metallic bronze-green; hairs silver.

Shape and sculpture. Head evenly punctured, slightly excavated in the middle between the eyes; no median keel; hairy. Pronotum evenly punctured; a short longitudinal median impressed line projects forwards from the basal crypt; at the sides rounded basally, then tapered and narrowed to the apex; hairy. Elytra costate, the intervals between flat, each with a deep row of punctures and faintly transversely wrinkled; parallel-sided until after the middle, then rounded and narrowed to the marginal spine; both spines well developed; humeral fold poorly developed and slightly angled. Undersurface with small shallow punctures in the middle, larger and deeper at the sides; hairy.

Size. Males $8.1 \pm 0.08 \times 3.2 \pm 0.04$ mm (37). Females $8.6 \pm 0.15 \times 3.4 \pm 0.06$ mm (32).

Distribution. Mainland eastern Australia from South Australia to Queensland.

General remarks. The yellow pattern is variable; there are either six spots and a fascia on each elytron or the fascia may be broken in the middle giving a total of eight spots.

Specimens examined. *S. Aust.*: 2 ♀, McDonald Ferries N.P. on *Callitris preissii*, 2.xi.1967, S. Barker; 1 ♂ & 1 ♀, 2 km E of Hartley on *C. preissii*, 15.xi.1969, S. Barker; 7 ♂ & 7 ♀, McDonald Ferries N.P. on *C. preissii*, 15.xi.1969, S. Barker; 2 ♂ & 2 ♀, on road N of Parra Wirra N.P. on *C. preissii*, 10.xii.1969, S. Barker; 7 ♂ & 11 ♀, Tothill Ranges near Brady Creek on *C. preissii*, 12.xii.1969, S. Barker; 1 ♀, Onkaparinga Gorge near Hackham on *Callitris rhomboideus*, 27.xii.1969, S. Barker; 11 ♂ & 5 ♀, Mt Remarkable N.P. on *C. preissii*, 30.xii.1969, S. Barker; 2 ♂ & 2 ♀, Alligator Gorge N.P. on *C. preissii*, 30.xii.1969, S. Barker; 5 ♂ & 2 ♀, Mt Remarkable N.P. on *C. preissii*, 22.x.1971, S. Barker; 1 ♂, McDonald Ferries N.P. on *C. preissii*, 14.xi.1971, S. Barker; 2 ♂, 16 km N of Mannum on *C. preissii*, 20.xi.1971, S. Barker; 6 ♂ & 7 ♀, Salter Springs on *C. preissii*, 24.ix.1972, S. Barker; 4 ♂ & 3 ♀, Alligator Gorge N.P. on *C. preissii*, 8.x.1972, S. Barker; 1 ♂, 10 km W of Penneshaw, Kangaroo I. on *C. preissii*, 24.xi.1972, S. Barker; 1 ♂ & 1 ♀, near Rocky Point, Kangaroo I. on *C. preissii*, 21.x.1974, S. Barker. *Qld.*: 7 ♀, Stanthorpe, E. Sutton, QM.

34. *Astraeus (Astraeus) oberthuri* van de Poll, 1889: 85, 100, 101, pl. 3, fig. 13, 13a. Kerremans, 1892: 102, Blackburn, 1892: 211, Kerremans, 1902: 149, Carter, 1929: 282, Obenberger, 1930: 366.

FIG. 23N

Type. Holotype ♂, MNHN (seen by author).

Colour. Shiny. Head, antennae and pronotum

black with purple and blue reflections. Elytra black with purple reflections, each with the following yellow markings: a basal spot; a fascia commencing at the shoulder, covering the humeral fold and running towards the suture but not touching it, slightly concave towards the base; a spot at the middle touching the margin; a preapical spot; a spot midway between the previous two which may or may not touch the margin; a spot midway between the fascia and the preapical spot, near the suture but not touching it, absent in some specimens. Undersurface and legs metallic purple; hairs silver.

Shape and sculpture. Head closely and evenly punctured at the base and sides, punctures coalescing and wrinkled at the apex; no median keel; hairy. Pronotum closely and evenly punctured in the middle, punctures coalescing and wrinkled at the sides; a short median longitudinal impressed line projects forwards from the basal crypt; parallel-sided from the base until after the middle, then rounded and narrowed to the apex, front edge projecting slightly in the middle; dorsally convex in lateral profile; hairy. Elytra costate, the intervals between flat, each with a row of punctures and faintly transversely strigose; parallel-sided to the middle then rounded and tapered to the small marginal spine; sutural spine well developed; humeral fold poorly developed and slightly angled. Undersurface with shallow punctures closer at the sides than in the middle; hairy.

Size. Males $9.7 \pm 0.10 \times 3.6 \pm 0.04$ mm (58). Females $9.8 \pm 0.34 \times 3.6 \pm 0.15$ mm (18).

Distribution. Western Australia.

Specimens examined. W. Aust.: Type; 1 ♂, Yanchep, 7.i.1962, F. H. Utter Baker; 3 ♀, Gosnells on *Casuarina* sp., 7.i.1967, S. Barker; 19 ♂ & 1 ♀, 8 km W of Beverly T.O. from Brookton Rd, on *Casuarina* sp., 1.i.1967, S. Barker; 1 ♂, 77 km along main York Rd, on *Casuarina* sp., 1.i.1968, S. Barker; 8 ♂ & 1 ♀, Red Hill Rd, near Midland Junction on *Casuarina* sp., 4.i.1968, S. Barker; 2 ♂, 77 km along main York Rd, on *Casuarina* sp., 5.i.1968, S. Barker; 6 ♂ & 2 ♀, 77 km along main York Rd, on *Casuarina huegeliana*, 7.xi.1970, S. Barker; 3 ♂ & 2 ♀, 7 km E of North Bannister on *C. huegeliana*, 19.xi.1970, S. Barker; 8 ♂ & 3 ♀, 13 km E of North Bannister on *C. huegeliana*, 19.xi.1970, S. Barker; 5 ♂ & 3 ♀, 77 km along main York Rd, on *C. huegeliana*, 21.xi.1970, S. Barker; 1 ♂, 77 km along main York Rd, on *C. huegeliana*, 7.xii.1970, S. Barker; 3 ♂ & 2 ♀, Wannamal on *C. huegeliana*, 10.xii.1970, S. Barker; 2 ♂, 135 km along Albany Highway on *C. huegeliana*, 10.i.1973, S. Barker.

35. *Astraeus (Astraeus) watsoni* sp. nov.

FIG. 18

Types:

Holotype: ♀, Borden, W. Aust., 16.xii.1957, R. P. McMillan & J. A. L. Watson, WAM, 71-1761.

Paratypes: 1 ♀, ANIC; 1 ♀, Goomalling, W. Aust., SAM; 1 ♀, W. Aust., SAM; 1 ♀, Borden, W. Aust., 16.xii.1957, R. P. McMillan & J. A. L. Watson, MNHN; 1 ♀, Borden, W. Aust., 16.xii.1957, R. P. McMillan & J. A. L. Watson, WAM, 71-1760.

Colour. Shiny. Head, pronotum and elytra black with blue and purple reflections; antennae black with blue and purple reflections, the base and apex of the first segment and apex of the second segment brown. Elytra: each elytron with the following yellow markings: a large basal spot; a broad fascia commencing at the margin and covering the humeral fold, running transversely towards the suture but broken in the middle forming a large spot near the suture but not touching it; after the middle, a broad fascia concave backwards and not touching the margin or the suture; a small preapical spot; a small spot between the fascia near the margin but not touching it. Undersurface black with blue and purple reflections; hairs silver. Legs brown; top edges of the femur and top surfaces of the tarsi dark brown.

Shape and sculpture. Head shallowly but evenly punctured; with a median keel; covered with very long hair. Pronotum with punctures evenly dispersed; a median longitudinal impressed line projects forwards from the basal crypt to the middle; sides gently rounded and narrowed from base to apex; hairy. Elytra costate, the intervals between convex at the basal half, flat at the apical half, each with a row of shallow punctures and slightly transversely wrinkled; parallel-sided until just before the middle, tapered gradually to the marginal spine which is moderately developed; strongly developed sutural spine; humeral fold moderately developed and angled. Undersurface evenly and shallowly punctured; hairy.

Size. Females $12.9 \pm 0.73 \times 4.6 \pm 0.30$ mm (6).

General remarks. Named after Dr J. A. L. Watson.

Specimens examined. Types only.

36. *Astraeus (Astraeus) carteri* sp. nov.

FIGS 15, 230

Types:

Holotype: ♂, 383 km along Payne's Find Rd, W. Aust., on *Casuarina dielsiana*, 17.ix.1970, S. Barker, SAM, 120949.

Allotype: ♀, Lake King, W. Aust., 18.xii.1970, E. & K. Carnaby, SAM, T 20950.

Paratypes: 3 ♂, 383 km along Payne's Find Rd, W. Aust., on *C. dielsiana*, 17.ix.1970, S. Barker, ANIC (1 ♂), BM (1 ♂), MNHN (1 ♂); 3 ♂ & 1 ♀, Borden, W. Aust., on *Casuarina glauca*, 16.x.1939, H. W. Brown, ANIC (1 ♀), WAM (3 ♂), WAM, 73-68/70; 2 ♀, Lake Grace, W. Aust., MNHN (1 ♀), WAM (1 ♀), WAM, 73-66; 3 ♂, Lake Grace, H. W. Brown, WAM, 33-735/6, 73-65; 1 ♂ & 1 ♀, Southern Cross, H. W. Brown, WAM, 73-67, 73-63; 2 ♂, Tallering Station, Pindar on *Casuarina* sp., 22.ix.1958, S. Barker, WAM, 73-72/3.

Colour. Shiny. Head black with purple reflections; antennae black with blue-green and purple reflections. Pronotum black with blue-green reflections on top and purple reflections at the margins. Elytra black with purple reflections with the following yellow markings: a spot at the base; a spot originating at the shoulder covering the humeral fold; a spot above the middle touching the outer margin; a spot below the middle, near the outer margin but not touching it; three spots close to the suture but not touching it, the first the largest above the middle, the next smaller below the middle and a longitudinally elongate preapical spot (the first of these sometimes coalesces with the spot covering the humeral fold to form a fascia, concave towards the base). Undersurface and legs dark metallic purple; hairs silver.

Shape and sculpture. Head closely punctured; no median keel; hairy. Pronotum evenly punctured; with a short median longitudinal impressed line projecting forwards from the basal crypt, running forwards from the impressed line is a glabrous line formed by lack of perforations, better defined in females where it reaches the anterior margin than in males where it runs only to the middle; sides rounded and narrowed to the strong marginal apex; dorsally flattened in lateral profile; hairy at the sides but less so in the middle. Elytra costate, the intervals between flat with a row of shallow punctures; sides at first diverging slightly outwards from the base then parallel-sided to before the middle, then gradually rounded and narrowed to the strong marginal spines; well developed sutural spines; humeral fold poorly developed but slightly angled. Undersurface finely and sparsely punctured in the middle more closely at the sides; densely hairy.

Size. Males $11.2 \pm 0.16 \times 4.0 \pm 0.08$ mm

(13). Females $12.0 \pm 0.92 \times 4.3 \pm 0.40$ mm (3).

Distribution. Western Australia.

General remarks. *A. carteri* shows closest affinity with the following group of species: *A. macmillani*, *A. carnabyi*, *A. badeni*, *A. jansoni*, *A. oberthuri* and *A. watsoni*. Named after the late Mr H. J. Carter.

Specimens examined. Types only.

37. *Astraeus (Astraeus) goerlingi* sp. nov.

FIGS 16, 23P

Types.

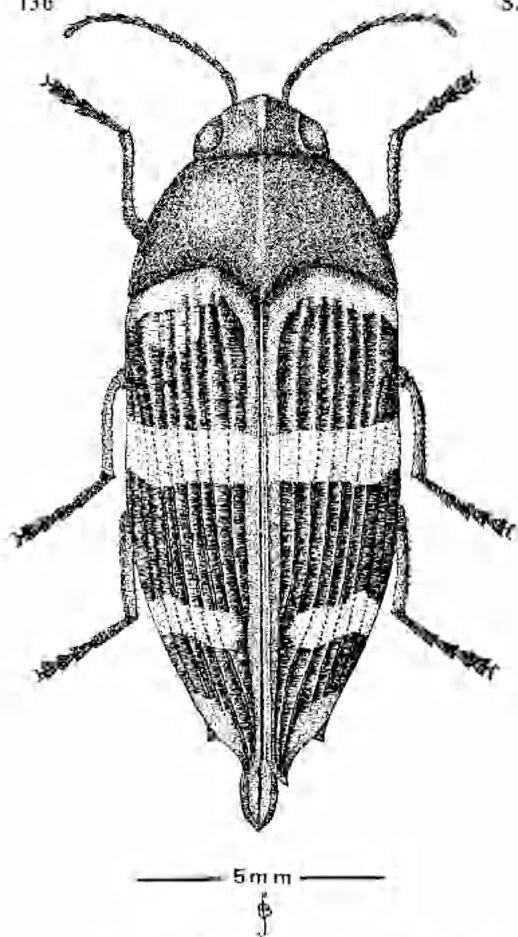
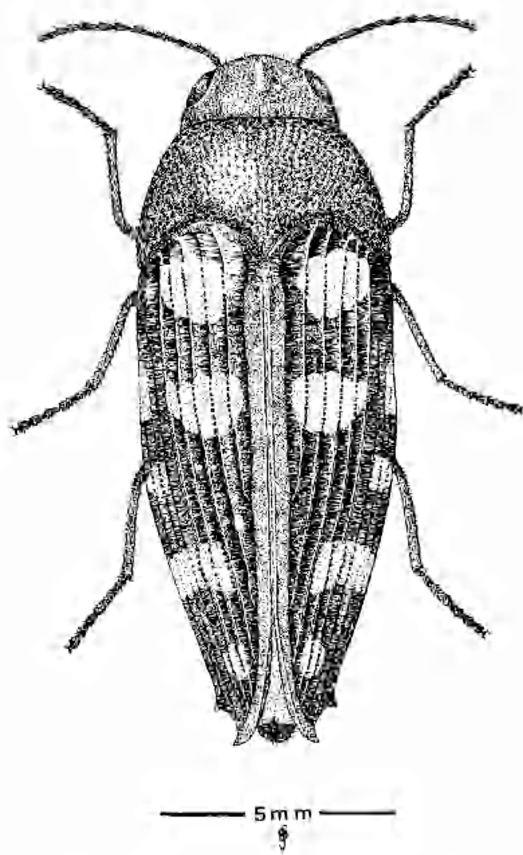
Holotype: ♂, Marloo Stn, Wurarga, W. Aust., 1931-1941, *A. Goerling*, ANIC.

Allotype: ♀, Marloo Stn, Wurarga, W. Aust., 1931-1941, *A. Goerling*, ANIC.

Paratypes: 4 ♂ & 3 ♀, Marloo Stn, Wurarga, W. Aust., 1931-1941, *A. Goerling*, ANIC (1 ♂ & 1 ♀), BM (1 ♂ & 1 ♀), SAM (1 ♂), WAM (1 ♂ & 1 ♀); 3 ♀, 106 km S of Payne's Find, W. Aust., on *Casuarina acutivalvis*, 18.ix.1970, S. Barker, SAM; 2 ♂ & 1 ♀, Wurarga, W. Aust. on *Casuarina principiana* 16.ix.1935, H. W. Brown, NM.

Colour. Shiny. Head, antennae and pronotum black with bronze, blue or purple reflections, or a combination of these colours. Elytra black with purple reflections, each with the following yellow markings: a basal spot; a fascia commencing at the shoulder and covering the humeral fold, running towards the suture but not touching it, concave towards the base; a spot at the middle touching the margin; a preapical spot; a spot midway between the two previously mentioned marks, elongate and touching the margin; a spot near the suture, but not touching it, midway between the fascia and the preapical spot. Undersurface and legs purple, coppery and bronze; hairs silver.

Shape and sculpture. Head closely and evenly punctured; slightly excavated in the middle between the bases of the eyes; no median keel; hairy. Pronotum with punctures larger at the sides than in the middle, median longitudinal glabrous line from base to apex formed by the absence of punctures; gently rounded at the sides from base to apex; hairy. Elytra costate at the apex, punctate-striate at the base, the intervals between flat at the apex and convex at the base, each with a row of punctures; parallel-sided to the middle then rounded and narrowed to the marginal spine, which is well developed; sutural spine sharp but shortened by the sutural margin being straight and superficially appearing to be broken; humeral fold poorly developed and slightly angled. Undersurface evenly punctured, the punctures

Fig. 17. *Astraeus major* BlackburnFig. 18. *Astraeus watsoni* sp. nov.

deeper at the sides than in the middle; hairy. In the male the last abdominal sternite has a marginal indentation in the centre.

Size. Males $10.8 \pm 0.12 \times 3.8 \pm 0.05$ mm (26). Females $11.7 \pm 0.19 \times 4.2 \pm 0.07$ mm (22).

Distribution. Western Australia.

General remarks. *A. goerlingi* shows features in common with the preceding group of species (Fig. 23P) and also with the following group of two species, and because of this I place it by itself between the two groups. Named after the late Mr A. Goerling.

Specimens examined. W. Aust.: Types; 20 ♂ & 14 ♀, Marloo Stn, Wurruga, 1931-1941, A. Goerling, ANIC.

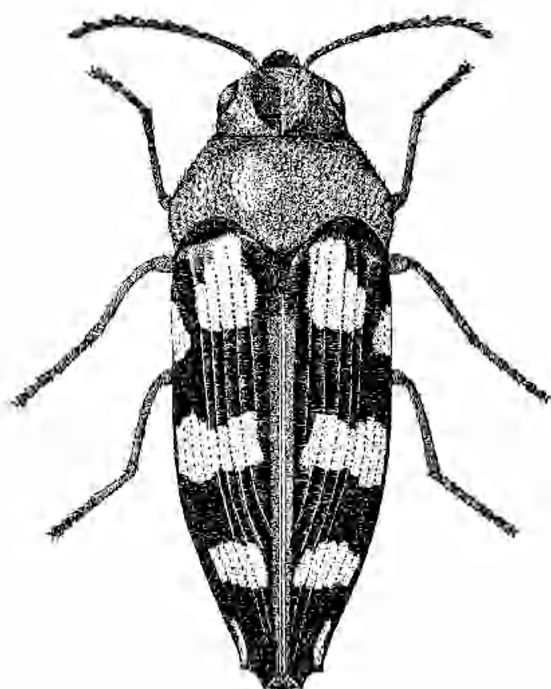
38. *Astraeus (Astraeus) cyaneus* Kerremans, 1900: 295; 1902: 148. Carter, 1929: 282. Obenberger, 1930: 365.

FIG. 19

Type. Holotype: ♂, Standing, N.S.W., BM (seen by author).

Colour. Shiny. Head and pronotum blue-green; antennae black with blue reflections. Elytra black with blue-green reflections, each with the following yellow markings: a large elongate basal spot not reaching the anterior margin or suture; a fascia at the middle, expanded towards the apex near the lateral margin but not touching it or the suture; a large spot after the middle, not touching the margin or the suture; a spot covering the humeral fold; a small elongate spot in the form of a lunette near the preapical margin and ending at the marginal spine (present in the illustrated specimen, absent in the holotype). Undersurface blue-green; hairs silver. Legs metallic blue.

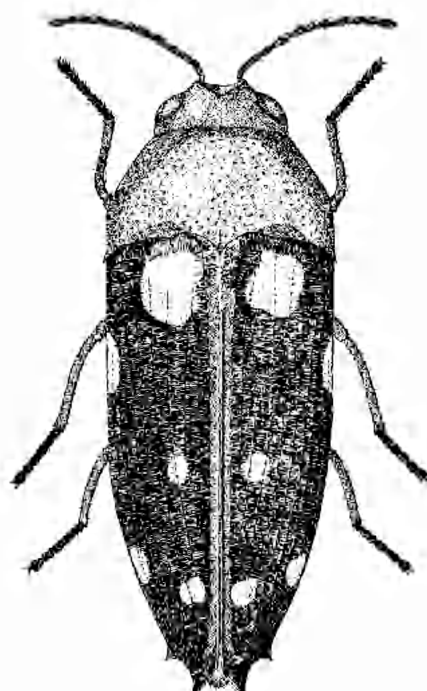
Shape and sculpture. Head evenly punctured; deeply excavated between the eyes, mainly at the base; no median keel; sparsely covered with long, fine hair. Antennae strongly serrate. Pronotum deeply punctured at the sides, towards the middle shallow punctures with a central ovoid area consisting of hexagonal

Fig. 19. *Astraeus cyaneus* Kerremans

depressions, each with a small central puncture; inflated at the sides just before the middle, then straight sided and strongly tapered to the apex; the lateral lobes with their apices turned downwards; convex at the apex, flattened at the base; covered with fine hair. Elytra flattened; punctate-striate anteriorly, costate posteriorly, the intervals between convex towards the base and flat at the apex, each with a single longitudinal row of shallow punctures and slightly transversely wrinkled; parallel-sided to the middle, then rounded and narrowed to the small marginal spine; sutural spine shortened by the sutural margin being straight and turned slightly upwards; humeral fold poorly developed but slightly angled. Undersurface evenly but shallowly punctured in the middle; lateral prosternum and abdominal sternites longitudinally grooved; sparsely haired.

Size. Males 11.6 x 3.9 mm (1). Females 13.9 x 4.8 mm (1).

Distribution. New South Wales and Queensland.

Fig. 20. *Astraeus caledonicus* Fauvel

Specimens examined. N.S.W.: Type. Old: 1 ♀, Acacia Creek via Killarnay, Jan. 1948, Mrs J. Harstett, JH.

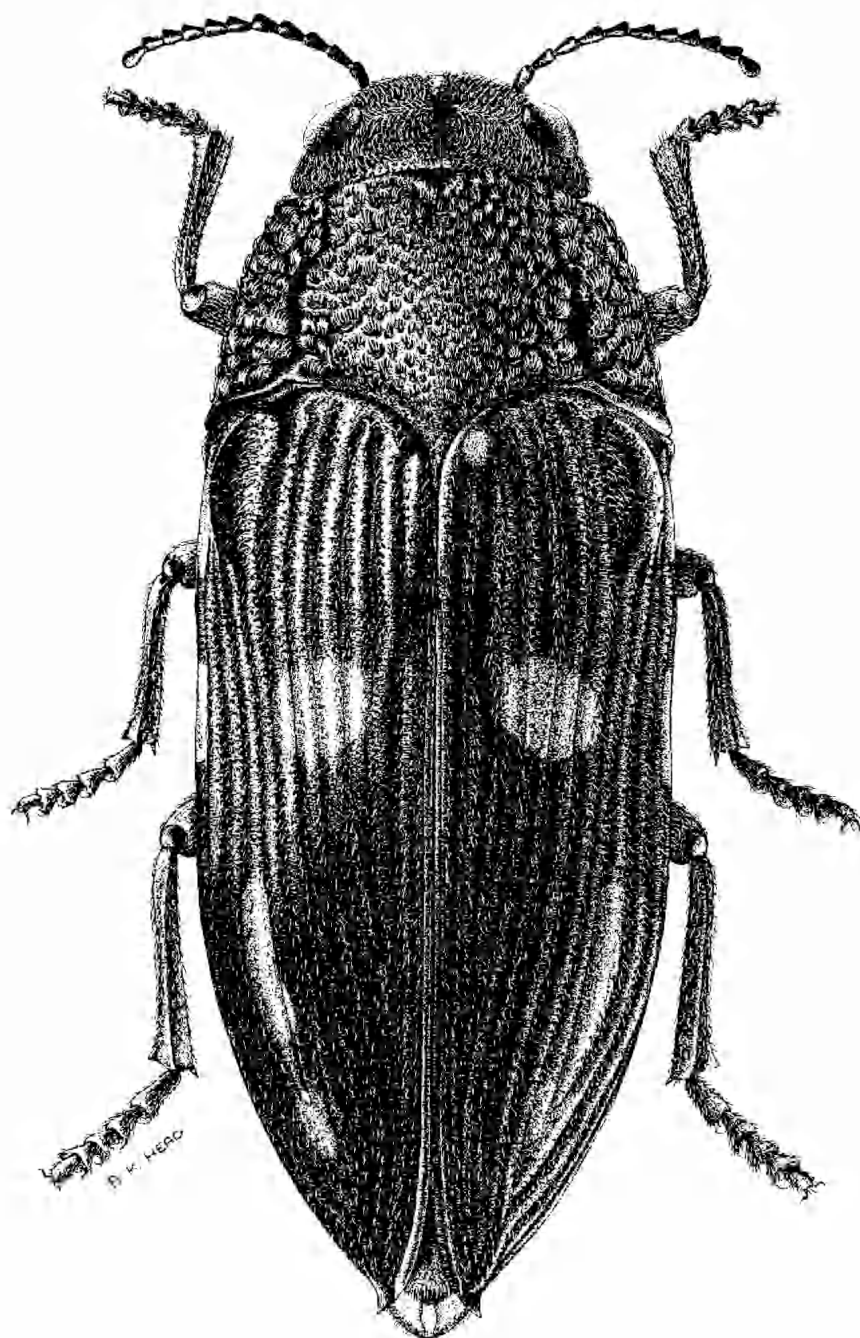
39. *Astraeus (Astraeus) caledonicus* Fauvel, 1904: 116. Obenberger, 1930: 365.

FIG. 20

Type. Holotype: ♀, Baie du Sud, N. Caledonie, Delauney, MNHN (seen by author).

Colour. Upper surface glabrous. Head and pronotum black with green reflections; antennae purple. Elytra black with yellow reflections, each elytron with the following yellow markings: a large basal spot; a small spot after the middle near the suture but not touching it; a spot at the margin covering the humeral fold; a spot after the middle at the margin but not touching it; and slightly behind the last a spot near the suture but not touching it. Undersurface black with green and purple reflections; hairs silver. Legs red-brown with purple reflections; tarsi dark-brown with blue reflections.

Shape and sculpture. Head shallowly but evenly punctured; excavated between the eyes mainly at the apex; no median keel; without hairs. Pronotum shallowly but sparsely punc-



— 5 mm —

Fig. 21. *Astraeus robustus* sp. nov.

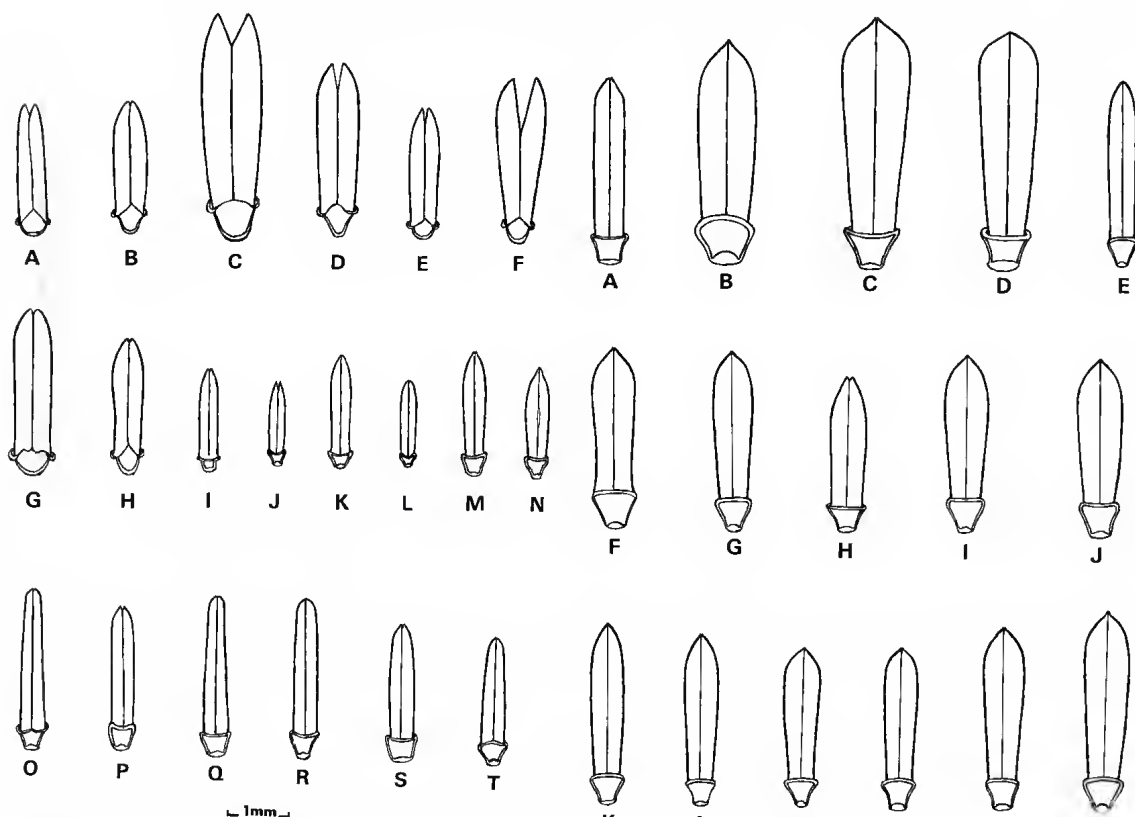


Fig. 22. Outline diagrams of the parameres of male *Astraeus (Depollus)* species (A-H) and *Astraeus (Astraeus)* species (I-T), dorsal surface uppermost. A-polli; B-tamminensis; C-robustus; D-aberrans; E-lineatus; F-multinotatus; G-irregularis; H-dedariensis; I-bakeri; J-minutus; K-fraseriensis; L-pygmaeus; M-smythii; N-simulator; O-obscurus; P-globosus; Q-mastersi; R-samouelli; S-dilutipes; T-adamsi.

tured; a short but deeply impressed median longitudinal line projects forwards from the basal crypt; parallel-sided at the base, before the middle rounded and obliquely narrowed to the apex; median lobe short and blunt, apices of lateral lobes sharp and turned downwards. Elytra punctate-striate, the intervals between convex with a few faint transverse wrinkles at the base, without hairs or punctures; parallel-sided until after the middle, then gently rounded to the strong marginal spine; apical

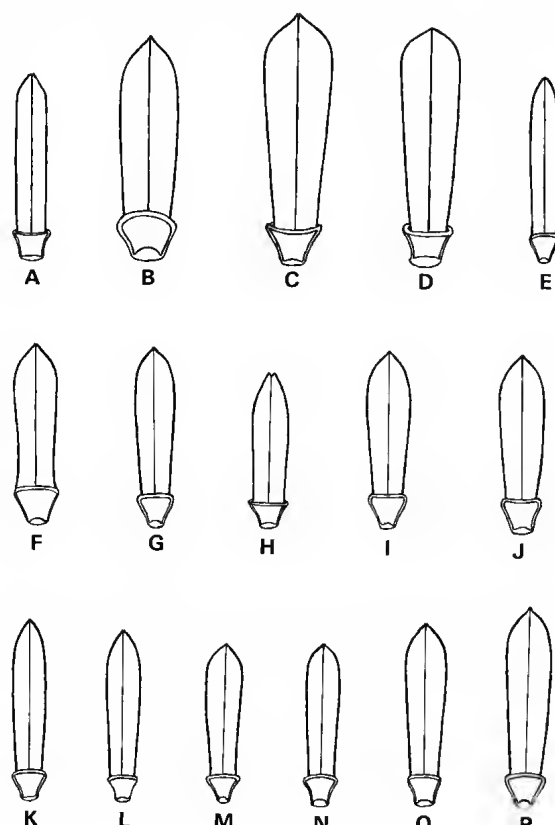


Fig. 23. Outline diagrams of the parameres of male *Astraeus (Astraeus)* species, dorsal surface uppermost. A-intricatus; B-crassus; C-major; D-navarchis; E-fraterculus; F-prothoracicus; G-elongatus; H-vittatus; I-flavopictus; J-macmillani; K-carnabyi; L-badeni; M-jansoni; N-oberthuri; O-carteri; P-goerlingi.

spine with a straight internal edge; humeral fold rounded and barely obvious. Undersurface shallowly and sparsely punctured; lightly haired.

Size. Females 11.5 x 4.1 mm (1).

Distribution. New Caledonia.

General remarks. *A. caledonicus* shows close affinity with *A. cyaneus*.

Specimens examined. Type only.

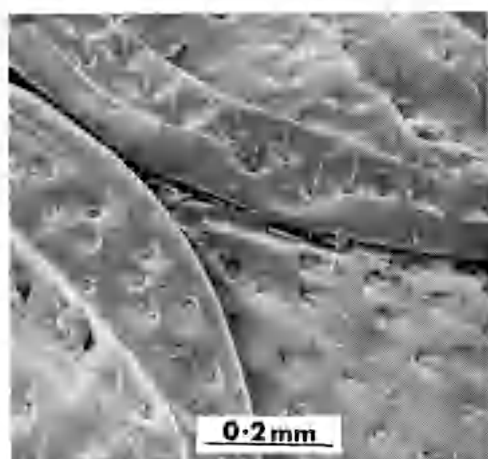


Fig. 24. Scanning electron micrograph of the median lobe of the pronotum of *A. fraseriensis* showing the basal crypt.

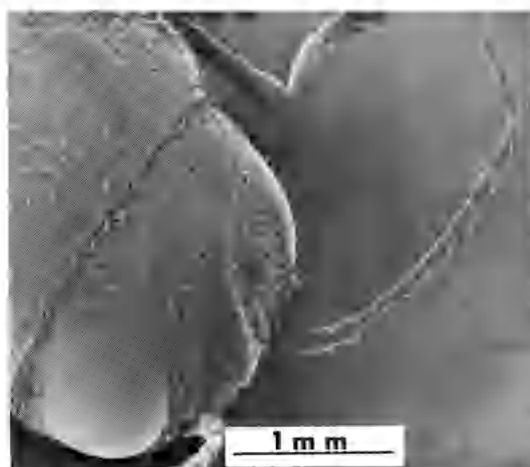


Fig. 25. Scanning electron micrograph of the head of *A. fraseriensis* showing the median longitudinal keel.

Index

TO THE VALID SPECIES AND SYNONYMS OF *ASTRAEUS*, WITH THE NUMBERING SYSTEM ADOPTED IN THE TEXT

Valid Species	Synonyms
<i>aberrans</i> van de Poll 4	
<i>adamsi</i> sp. nov. 20	
<i>badeni</i> van de Poll 32	= <i>meyricki</i> Blackburn
<i>bukeri</i> sp. nov. 9	
<i>caledonicus</i> Fauvel 39	
<i>carabyi</i> sp. nov. 31	
<i>carteri</i> sp. nov. 36	
<i>crassus</i> van de Poll 22	
<i>cyaneus</i> Kerremans 38	
<i>dedariensis</i> sp. nov. 8	
<i>dilutipes</i> van de Poll 19	= <i>strandii</i> Obenberger
<i>elongatus</i> van de Poll 27	
<i>flavopictus</i> LaPorte & Gory 29	
<i>fraseriensis</i> sp. nov. 11	
<i>fraterculus</i> van de Poll 25	
<i>globosus</i> sp. nov. 16	
<i>goerlingi</i> sp. nov. 37	
<i>intricatus</i> Carter 21	
<i>irregularis</i> van de Poll 7	
<i>jansonii</i> van de Poll 33	= <i>tepperi</i> Blackburn
<i>lineatus</i> van de Poll 5	
<i>macmillani</i> sp. nov. 30	
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<i>minutus</i> sp. nov. 10	
<i>multinotatus</i> van de Poll 6	
<i>navarchis</i> (Thomson) 24	
<i>oberthuri</i> van de Poll 34	
<i>obscurus</i> sp. nov. 15	
<i>polli</i> sp. nov. 1	
<i>prothoracicus</i> van de Poll 26	
<i>pygmaeus</i> van de Poll 12	
<i>robustus</i> sp. nov. 3	
<i>samouelli</i> Saunders 18	
<i>simulator</i> van de Poll 14	
<i>smythi</i> sp. nov. 13	
<i>tamminensis</i> sp. nov. 2	
<i>vittatus</i> van de Poll 28	
<i>watsoni</i> sp. nov. 35	

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